# COAL AGE

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# THE CREED OF SERVICE

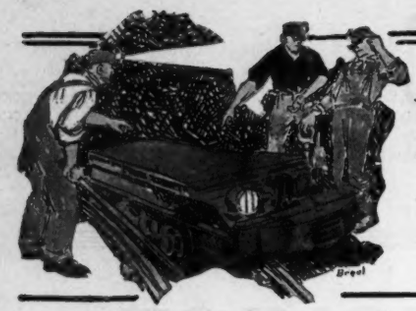
*By Berton Braley*

WITHOUT sleek, smug self-righteousness
Or any narrow bigot's zeal,
I hold this constitutes success:
To labor for the common weal,
To do your work the best you can,
To get your wage for what you do
While striving that your fellowman
May win his honest wages, too.

I HOLD that in a world of men
Where money buys the things we need,
That he who toils with pick or pen
Should hold in scorn not gold, but greed!
That he should have his just return
From work of hand or brain and nerves,
But let his effort be to earn
His recompense as one who serves.

WE all must serve, it is the test
Of high endeavor and of worth;
And he who does his job the best
Is one of any breed or birth
Who, holding high or low estate,
Visions the labor he can give
As part of that long war with fate
To make this life more fit to live.

THIS is my creed, and though it brings
No swollen wealth, I hope to find
I shall be paid with richer things—
Love and content and peace of mind.
And if, in all the rough world's stress
From this, my creed, I do not swerve,
I hope to sum my life's success
In this one simple phrase—'I serve!"



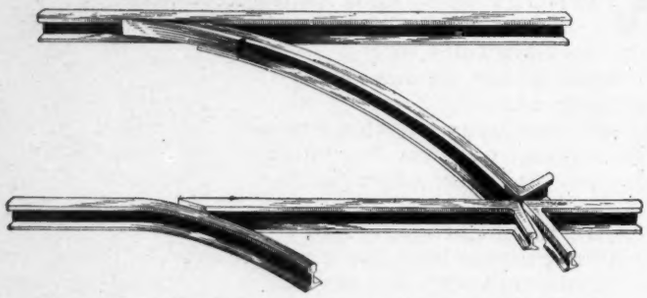
# IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

## Simple Scotch for T-Iron Road

BY MACHINE RUNNER
Sullivan, Indiana

A simple scotch to use on T-iron road where it is necessary to unload the mining machine may be made as follows: Take two fishplates and put one bolt through them in the second hole from the end. Tighten



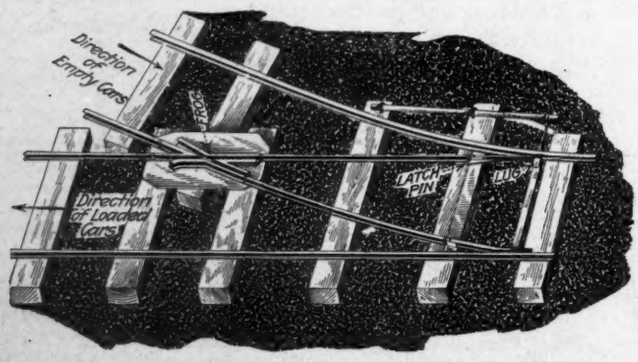
DETAILS OF SCOTCH FOR USE ON T-IRON ROAD

the bolt up to the desired size to fit the rail, then lay them clothes-pin fashion in front of the wheel which is to be scotched. There will now be no trouble in holding the machine while unloading.

## A Spring Latch

BY R. BOWEN
Pittston, Penn.

A spring latch for use where branch tracks are put in against the loaded cars is illustrated below. It is always the tendency of small 3-ft. latches to fly open when the car runs over the latch pin. This results in the derailing of the cars behind, and many a man bears




SIMPLE SPRING LATCH PREVENTS DERAILS

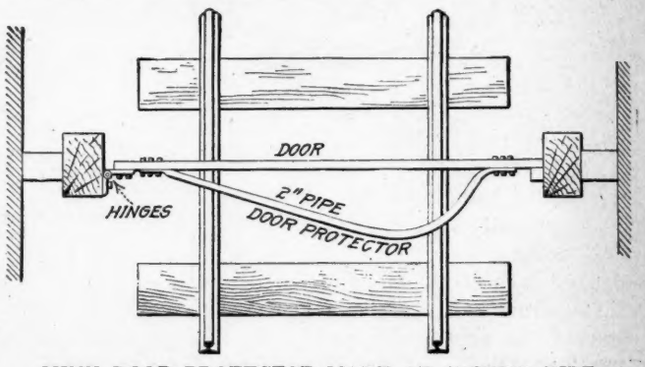
evidence of the dangerous practice of pulling the latch back into its place with his hand, as the trip goes over the latch.

The little kink shown, which is by no means new, is extremely simple and costs practically nothing to put in. An ordinary latch is taken to the blacksmith and a lug welded on its side 6 in. from the point and extending 2 to 3 in. below the latch. A hole ¼ to ½ in. in diameter is cut in the center of the lug, permitting the attachment of a piece of wire that runs under the latch and wing rail. The wire can be held in the hand a safe distance from the moving cars, or the limb of a tree, a pole or a sapling may be nailed or stapled to the ties, the wire being then tied to this pole.

A piece of ¼-in. iron rod bent to the shape of an eye-bolt that is slipped over the pole, the other end passing under the rail and latch and through the lug into a nut, answers the purpose better. The dotted lines show the position of the pole when an empty car passes back through the latches.

## A Mine Door Protector

A type of door protector adopted by one of the large coal companies of Pennsylvania, and used by it on many of its doors underground, is shown below. This protector is made as follows: A piece of 2-in. pipe of suitable length is bent in approximately parabolic curve, or one of changing radius. Each end of the pipe is




MINE DOOR PROTECTOR MADE OF CURVED PIPE

flattened for a distance of about 10 in., and the flattened portion reflexed sufficiently so that when the concave side of the curved pipe is next the door the flattened ends will lie flat upon it near either edge. The maximum clearance from the door to the pipe protector should be at a point about two-thirds of the distance from the hinged to the free side of the door, and should amount to about 1 foot.

This curved pipe protector is bolted securely to the door at each end, three bolts being employed ordinarily. It should be placed at such a height that the frame of the locomotive will strike it, thus pushing the door open. It also prevents the door from coming in contact with the sides of the cars in the trip, thus holding the door proper distance away.

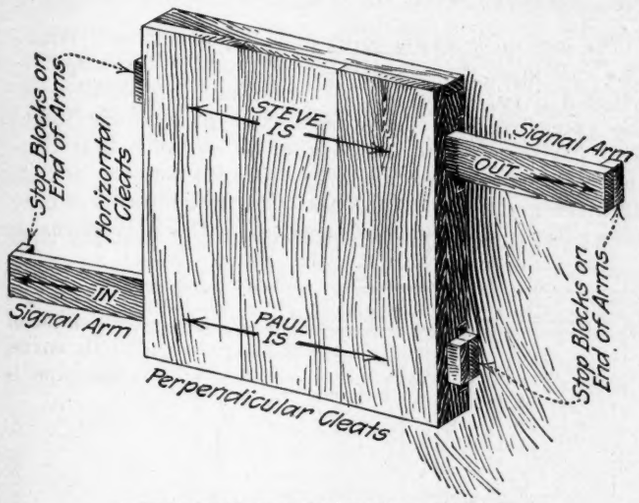
This device is cheap to build and install, and does its work efficiently. It will save its cost many times over in preventing damage to the door upon which it is placed.

## Block Signal Board

By Ralph W. Mayer
California, Penn.

It is necessary at times for two or more locomotives pulling coal from butt entries to use the same entry between the butt entries and the parting. Unless some method of signaling is adopted, the motormen do not know whether the track is clear, and confusion or lost time results. Makeshift or careless methods are sometimes used, such as hanging a piece of canvas from the trolley or roof.

A block signal board has been adopted by one large mining company as a more efficient method. This board is fastened to the rib, close to the track, at the junction of the butt and cross entry tracks. It is about 24 in. long and 18 in. wide. Four horizontal cleats are nailed to the back of the board. Each pair of these cleats are nailed far enough apart so that an arm 6 in. wide and 1




EFFICIENT BLOCK SIGNAL BOARD

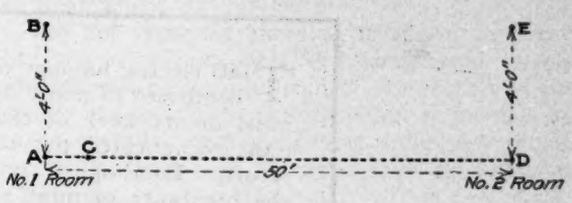
in. thick will easily slide between them. Two perpendicular pieces are nailed over these horizontal ones next to the edge of the board. These prevent the signal arm from falling out while the arm slides between them and the face of the board.

The arms have stop-blocks fastened to either end to prevent the arm from going too far. One end of the arm has OUT, the other IN printed upon it, with arrows showing the direction. On the face of the board is printed MOTOR NO.—IS—OUT—IN, the words OUT or IN being indicated by the signal arm, depending on which end of the arm is exposed. When the motorman goes out to the parting he exposes the end of the arm showing OUT. When he returns he exposes the end showing IN.

## Turning a Room Without the Engineer

By J. A. Monico
Besoco, W. Va.

A simple method of laying off rooms and entries is shown in the accompanying diagram. This method can be employed for rooms or entries turned at any angle. All the mine boss has to do is to learn from the engineer the distance between room centers on the angle turned. The mine boss can then turn the rooms and entries, and drive them at least 150 ft. before the engineer is needed. To illustrate: Suppose that *A B C* are spads for No. 1 room and the entry, and that No. 2 room is ready to be turned (in this case at a right angle to the entry) on a 50-ft. center. The first thing to do is to hang two plumb-bobs in spads *A* and *C*. Sight along the entry to *D* and measure 5 ft. on that line of sight. Mark the line of sight on the roof, and also the distance. Next measure the distance from



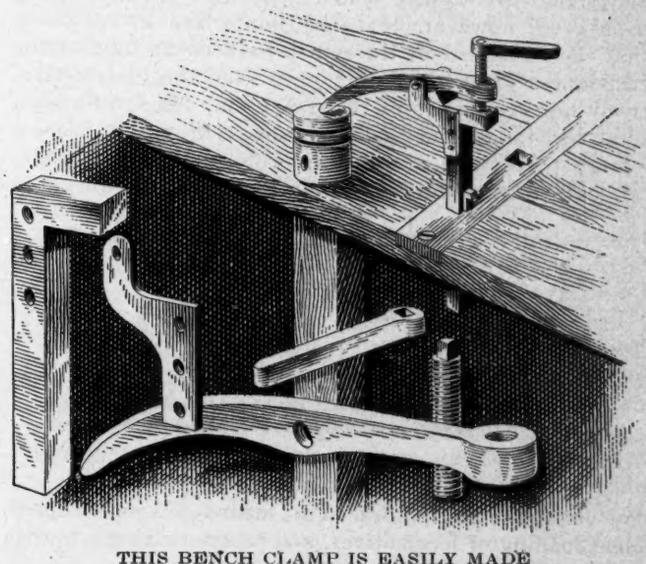

SIMPLE METHOD OF LAYING OFF ROOMS AND ENTRIES

*A* to *B;* in this case it is 4 ft. Then measure the distance *D E*, making it the same as *A B*. Next measure 50 ft. from *B* to *E*, keeping 4 ft. from E. The two points *D* and *E* are sights for No. 2 room. Several rooms can be turned in this manner and little error will be found.

## Clamp for the Work Bench

By Charles H. Willey
Concord, N. H.

The bench clamp illustrated herewith is simple to construct and of value to any mechanic who has much bench work to do. The contrivance is shown in both detailed and assembled views, but the dimensions have not been given as these can best be made to suit the size of work to be handled. The upright of the clamp is made of square stock, one end being bent over at



THIS BENCH CLAMP IS EASILY MADE

right angles to make the foot on which the clamp screw operates. Two pieces of iron plate make the lugs that hold the hinge pin of the clamp finger; these are riveted or bolted to the upright by three bolts.

The clamp finger is forged to a suitable curve and is made sufficiently large at the short end to take a $\frac{3}{4}$-in. screw. A piece of $3\frac{1}{2}$ x $\frac{5}{8}$ in. flat bar stock is machined with square holes and taper keyways in each hole and is set in flush with the bench top. This is bolted down. The tool is held firm by the taper wedges or keys, the leg of the tool being of sufficient length to raise and lower it to suit a wide range of work.

# Importance of the Proper Bonding of Mine Rails*

THE electric haulage circuit in a mine is like a chain, composed of many links or elements, each of which must do its work or the whole will be a failure. The most complicated portion of the electrical path is the return. Bonding, if properly done, greatly decreases the resistance of mine track; if improperly done, it is next to useless. The latest type of bond is that employing terminals welded to the rail ends.

BY C. C. BECK
Mansfield, Ohio

AN ELECTRIC haulage system is made up of electrical paths in series, each of which is a link in the electrical chain. If each does not properly perform its function, serious losses result. Fig. 1 shows diagrammatically a complete system. The current is generated at the power house, flows out over the feeder and trolley wires, through the locomotives and cutting machine motors, and back to the power house, through the rails and joints.

The importance of good rail bonds is often overlooked. The feeling appears to be prevalent that electricity will have no trouble in getting back to the power house over rails that are connected together with good splice plates that are tightly bolted in place. When it is remembered, however, that the joints are in series so that the resistance of the return path is the total of the resistances of all the joints, it is seen that a comparatively low average joint resistance may result in a high total resistance, and that the voltage drop may become a high percentage of the total potential. This results not only in considerable power loss but, still worse, in

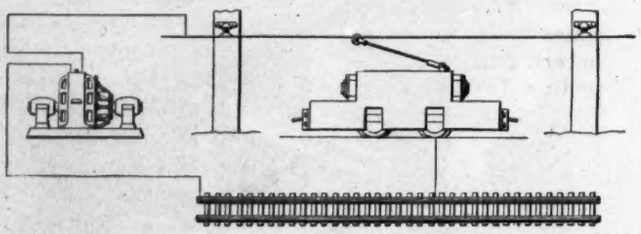


FIG. 1. DIAGRAM OF A COMPLETE HAULAGE SYSTEM

low voltage to the motors. This means slow speed, inefficient loading of locomotives, and correspondingly higher current values which burn out armatures.

On one property it was necessary to keep an armature winder constantly busy rewinding burnt-out armatures. The concern furnishing the coils suddenly noticed an absence of orders and checked up to see why this excellent coil business was not coming to them any more. The reason was that the manager had realized the poor bonding on his system and had rebonded the track, with the result that he had practically eliminated burning out of armatures and was furthermore hauling heavier loads at higher speeds than before.

The loss on a single joint may be surprisingly large. One rail joint that used to be in front of the house in which I lived impressed me more than any other with the excessive loss that might exist in a single joint. This particular joint would give off so much heat that snow was always melted away from its vicinity, and at night an arc would often be noticed which gave off considerable light. One of the boys of the neighborhood

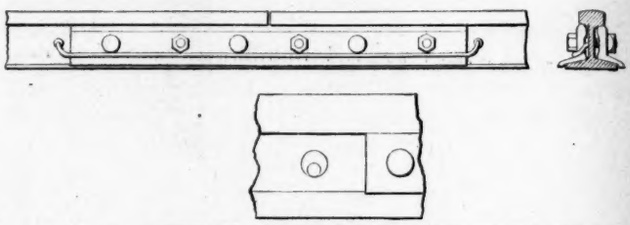


FIG. 2. METHOD OF HOLDING WIRE IN PLACE

ran a pair of wires and tapped them across this joint, carrying the wires into his window. He borrowed a voltmeter and found a 60-volt drop across the joint. He managed to get a small motor, which he connected to these wires. The neighborhood boys had considerable fun running all sorts of mechanical contrivances from this motor.

Iron oxide, or rust, has a high resistance, and it only takes a few days' time, when exposed to the weather or to the corrosive conditions of most mines, for rust to form over the rails and splice bars, insulating the rails from each other.

One of the first bonding methods employed to reduce the resistance between rails consisted of a piece of copper wire clamped under the bolt heads. Corrosion, however, soon proved this method no better than the splice bars alone. A later plan was to drill holes in the webs of the rails and insert the ends of a wire, holding these ends in place by driving in channel pins which were a little larger than the hole in the rail. This made a tight fit, the pin being compressed around the wire as shown in Fig. 2.

Channel pin bonding has also proved inefficient. In some cases failure has arisen from the old worn trolley wire used, which was so out of round and of such reduced size that it did not fit the channel pin closely and was not sufficiently compressed in installation. But even with good, new wire the moisture can enter the space between the pin and rail. It then spreads by capillary

*Paper presented before the Kentucky Mining Institute, Lexington, Ky., June 7, 1919.

attraction, soon corroding the surfaces and resulting in high resistance. Fig. 3 shows a channel pin removed from a rail in service. The crack and corrosion as well as the reduced diameter of the pin, which was originally the diameter of the circle drawn around

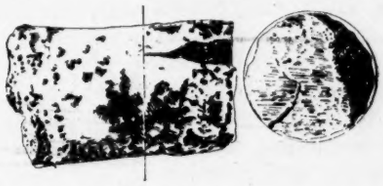
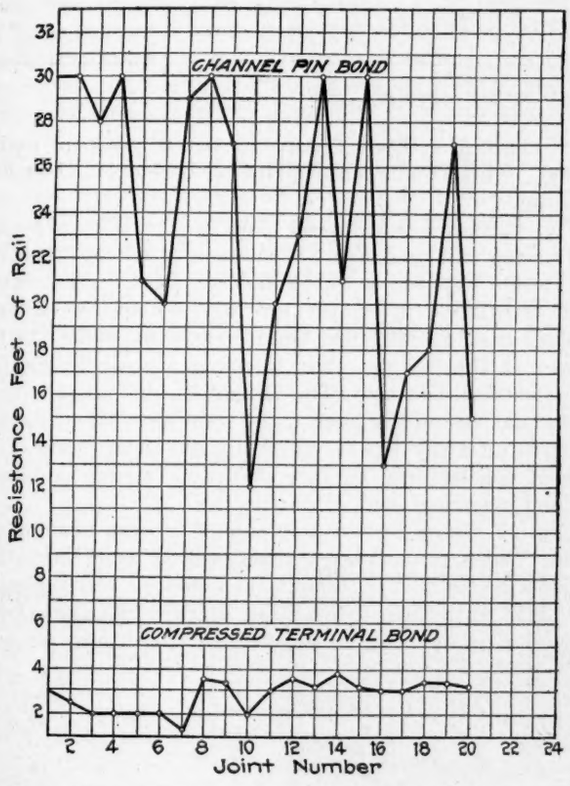


FIG. 3. A CHANNEL PIN AFTER SERVICE

it, should be noted. It is easily appreciated that such contacts cannot give a low resistance joint.

Fig. 4 is made up of actual readings on joints bonded with channel pins, in which the resistance per joint averaged between 12 and 30 ft. of rail. The lower curve, Fig. 5, shows corresponding track resistance when bonded with compressed terminal bonds in which no joint showed a resistance in excess of 4 ft. of rail.

Compressed terminal and pin expanded terminal bonds have now largely superseded those of the channel pin variety. Fig. 6 shows a compressed terminal bond in-




FIGS. 4 AND 5. JOINT RESISTANCE WITH VARIOUS BONDING

stalled under the splice plate, while Fig. 7 shows one placed around the splice plate. Fig. 8 shows this type of bond before being installed, the flexible cables being welded into the copper terminals which are expanded into the rail by means of the compressor (Fig. 10). Good results are secured when care is used in installation to see that the holes in the rails are properly drilled to size and the bonds expanded before the surface has rusted. If this is not possible, the holes should be drilled $\frac{1}{32}$ to $\frac{1}{64}$-in. under size and reamed just before the bond is put in place.

The bond terminal also should be cleaned with emery cloth just before being installed, and plenty of energy should be used on the compressor to insure a tight joint between the steel and the copper. With these precautions a low-resistance joint is secured which will withstand corrosion and vibration for many years without much deterioration.

The pin expanded terminal is shown in Fig. 9 and has the advantage over the compressed terminal of greater ease of installation. If proper care is used the results are practically the same, but if the hole happens to be oversize, due perhaps to improper grinding of the drills, there may not be enough expansion to give a tight contact.

Well applied compressed or pin-expanded terminal bonds are perhaps unexcelled under the service conditions to which they are suited, but no one type of bond is best for all conditions and the permanency of welded

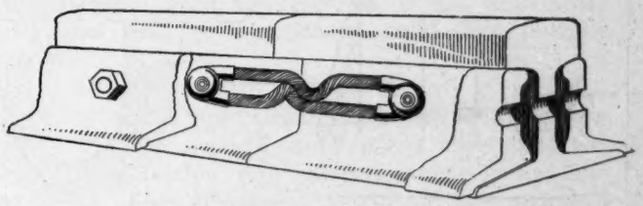


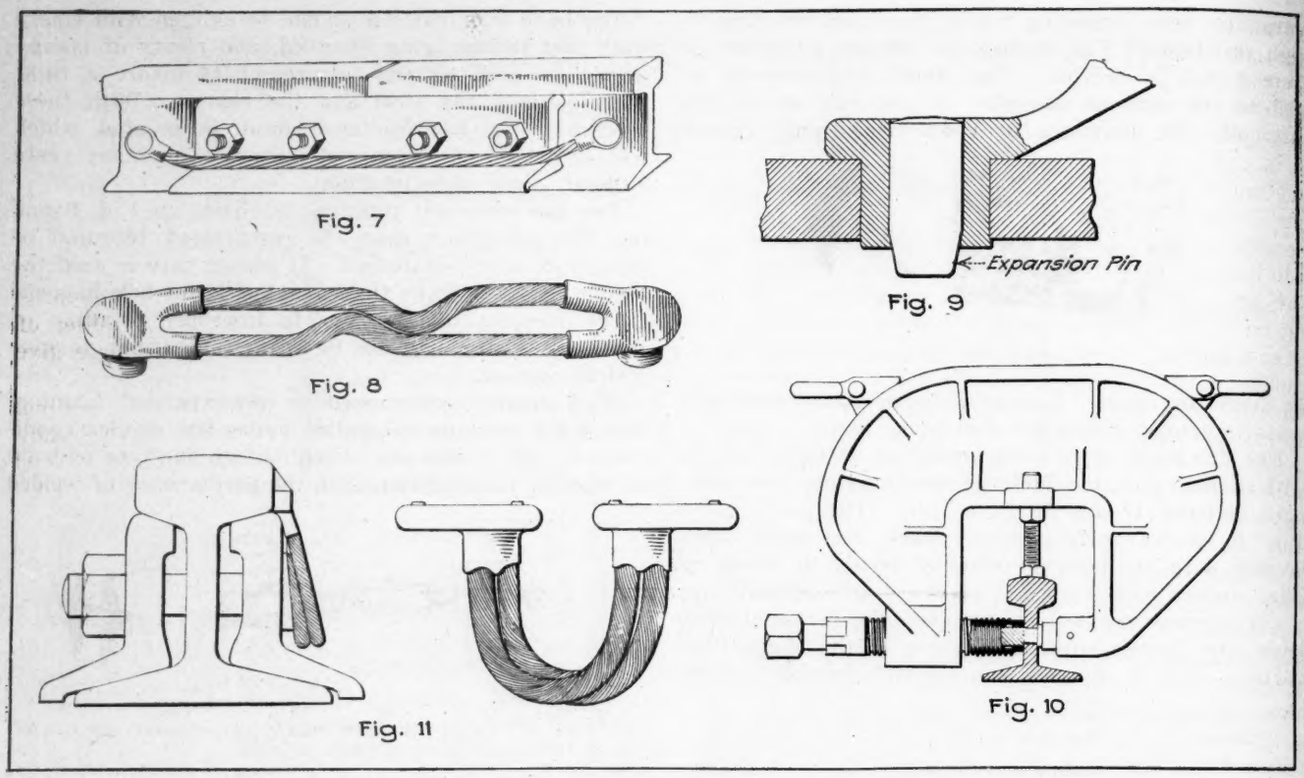
FIG. 6. COMPRESSED TERMINAL BOND UNDER SPLICE PLATE

contacts together with the recent advancement in welding practice has brought the welded type of bond into prominence.

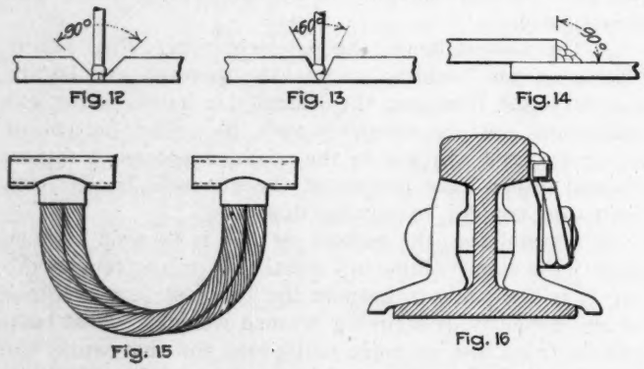
Of the welded bonds the gas-weld type (Fig. 11) is oldest, as gas welding came into general use before arc welding. However, the difficulty in handling the gas tanks and getting renewals and the added hazard of using an explosive gas in the confined spaces of underground mines have prevented the gas-weld bonds from becoming popular in mining districts.

In arc welding, the easiest method is to weld steel to steel with steel "filling-in" metal. In mine-track bonding it is desirable to keep to the simplest form because of the difficulty of securing trained welders. Most companies train one or more employees for this work, the concern furnishing the bonds or the welding machine, sending a demonstrator for a day or two to assist the bonding crew in getting started. Everyone will not develop into a good welder, and care must be used in selecting the proper man. The Government started a training school for welders in connection with shipbuilding, in which 90 days were spent in training and developing welders. Even then only a comparatively small number of men qualified as capable of handling all classes of work. In bonding, it has therefore been the custom to utilize the simplest of standard practice; and as the procedure is of a routine nature, only one form of weld is required, so that the time spent in learning is reduced to a minimum.

Fig. 12 shows a simple weld between two flat plates in which metal is built into a 90 deg. cut or groove. The figure shows the arc welding at the bottom of the groove, the metal being built up in successive layers until the groove is entirely filled. Fig. 13 shows a similar weld in which the groove is less than 90 deg. It is almost impossible with such an acute-angle groove to get a solid weld at the bottom because of the tendency of the arc to jump to the side of the groove. The 90-deg. angle between the work is considered the best practice,




FIGS. 7 TO 11. VARIOUS BONDS AND THEIR APPLICATION

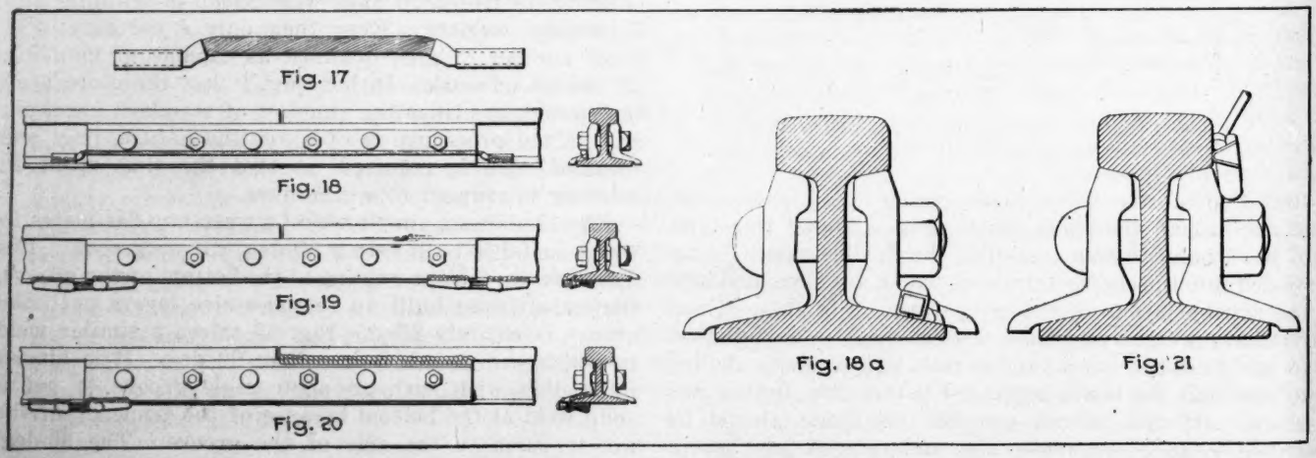



FIGS. 12 TO 16. PLATE AND BOND WELDING

as an acute angle makes it difficult or impossible to secure a good weld, while one greater than 90 deg. requires an excessive amount of time and filling-in metal. Fig. 14 shows a simple weld between two flat plates. Here again the 90-deg. angle between work is maintained. This fundamental principle is employed in rail bonding.

Fig. 15 shows an arc-weld bond for installation on the ball of the rail, and Fig. 16 shows it in place. The 90-deg. angle between work should be noted. The copper cable is fitted with copper terminals which are inclosed in steel casings, the steel being brazed or welded to the copper at the factory, thus insuring a good mechanical and electrical contact. The size of the terminal is such that it carries off the heat of the welding without danger of burning away the terminal under the arc, while the size of the welding surface insures a strong mechanical and electrical contact to the rail.

Fig. 17 shows an arc-weld bond for use around the splice plates, and Fig. 18 shows this bond installed. This is a method of installation that is recommended for light rails and for mining work generally. Figs. 19 and 20 show special applications which may be used




FIGS. 17 TO 21. VARIOUS APPLICATIONS OF WELDED BONDS

to advantage under certain conditions. It should be noted that with all these bonds the 90-deg. angle between the bond and the rail is employed, thus following standard welding practice.

Some bonds have been tried in which the upper surface of the terminal is beveled away from the rail, giving an angle between the working surfaces that is less than 90 deg., as shown in Fig. 21. This form, of bond however, is open to the criticism that it is difficult to get a good weld in the bottom of the groove.

For arc-weld bonding a simple resistance machine using trolley current is most convenient. It should be light enough to be carried readily by two men and should be sufficiently rugged to withstand the rough usage to which such apparatus is subjected in track work. The temperature rise should be low enough so that a fairly long life is secured. Fig. 22 shows one form of machine for this work.

In maintaining efficient bonding, periodic testing of the joints is recommended. There are several good bond testers on the market. One of the most accurate consists of a duplex millivoltmeter, Fig. 23, connected so that one instrument spans the joint and the other spans unbroken rail. By varying the length of unbroken rail spanned, a balance or equal reading is secured between the two instruments. It is only necessary to measure the unbroken rail spanned to secure the joint resistance in terms of feet of rail.

One of the commonest difficulties encountered in keeping up rail bonding arises from the bond installation and maintenance being put in charge of the track department, the members of which do not understand or appreciate the importance of careful bonding. They accordingly treat the whole bonding subject as a secondary matter and of little importance. This often results in good bonds being practically thrown away because of poor installation or to excessive loss arising from a few rail joints needing attention. It is especially recommended that each property using electric haulage arrange a bond department directly under the chief electrician. The business of this organization will be to install all bonds, test the track joints at regular intervals and, in general, make a study of the few fundamental considerations, which, if understood and followed, mean good results; but, if not understood or ignored lead to big losses which are entirely unnecessary.

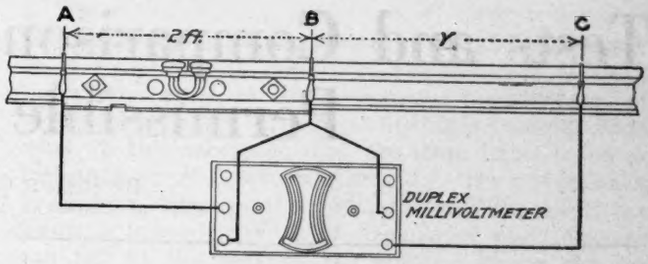



FIG. 23. DIAGRAM OF BOND TESTING INSTRUMENT

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**In many mines are telephone stations with connections to the surface, and many mines have also telephone communication with adjoining, near-by and distant mines. Such telephones should not be overlooked after a fire or an explosion. The alarm for a mine fire can probably be given by telephoning to different parts of the mine, and even after an explosion the telephone system may not be destroyed in all parts of the mine; hence effort should be made to call up the inside stations and to ascertain whether any men are alive and able to respond to call. The telephone should be used promptly for summoning assistance from the nearest mines as well as for informing the state mine inspector and any near rescue station or trained rescue men that can be reached by it.**

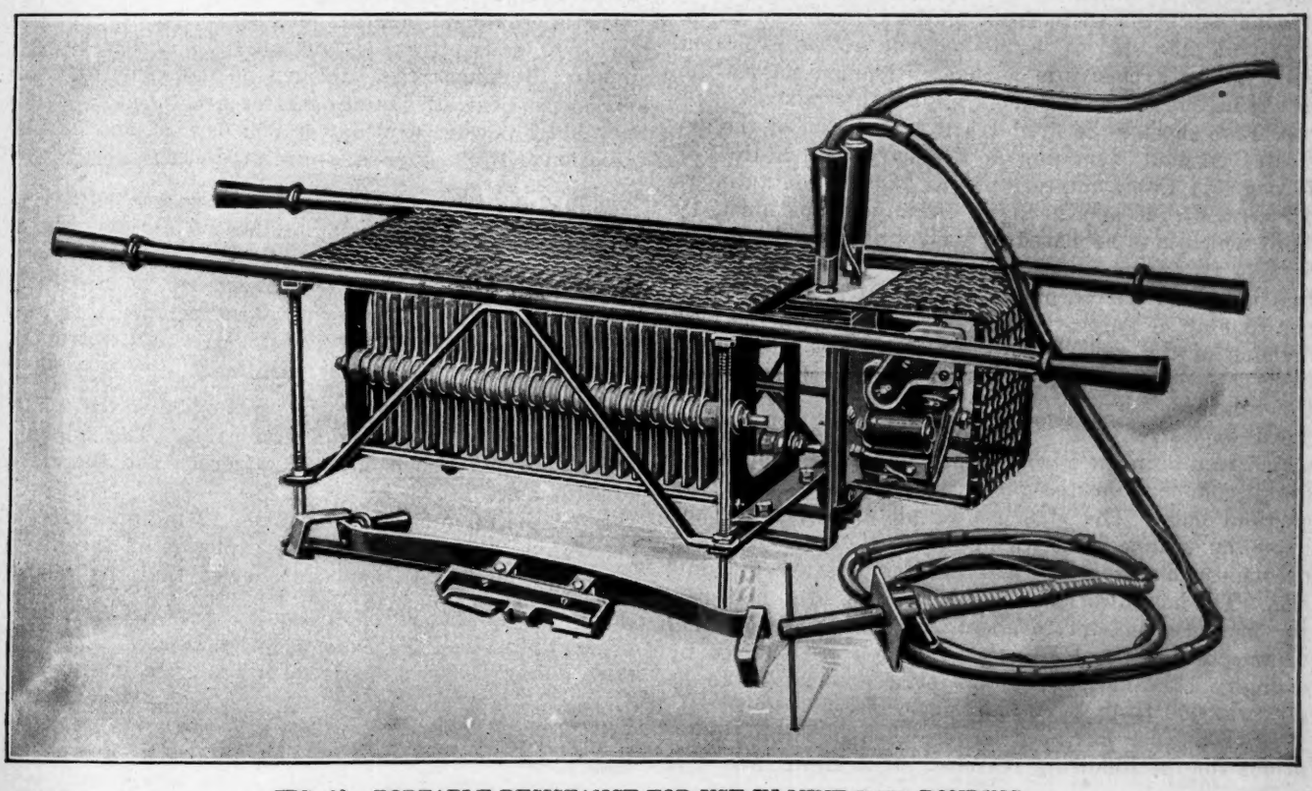

FIG. 22. PORTABLE RESISTANCE FOR USE IN MINE RAIL BONDING

# Tests and Comparisons of Various Types of Permissible Explosives*

By Joseph C. Thompson
Director of Mines and Minerals, State of Illinois

**SYNOPSIS**—*Considerable attention has been given to explosives during recent years by the Bureau of Mines. The principal field work in this connection has been carried on at the Pittsburgh station, especially the new explosives experiment branch near Bruceton, Penn. The following article notes the tests used by the Bureau of Mines to establish permissible explosives. A comparison is made of black powder and some permissible explosives; the different classes of permissibles are noted and discussed.*

IF AN explosive passes the three following tests, established by the Bureau of Mines for trial in its explosion gallery, then the explosive may be placed on the permissible list: 1. Ten shots each with the charge of a specified deflective power, in its original wrapper, shall be fired (each tamped with 1 lb. of clay stemming at a gallery temperature of 77 deg. F.) into a mixture of gas and air containing 8 per cent. of gas (methane and ethane) in the explosion gallery. An explosive is considered to have passed the test if no one of the ten shots explodes this mixture.

2. Ten shots each with the charge of a specified deflective power, in its original wrapper, shall be fired (each tamped with 1 lb. of clay stemming at a gallery temperature of 77 deg. F.) into 40 lb. of bituminous coal dust, 20 lb. of which is to be placed uniformly on a wooden bench placed in front of the cannon and 20 lb. placed on side shelves in the sections of the explosion gallery. An explosive is considered to have passed the test if no one of the ten shots ignites this mixture.

3. Five shots to be fired (each with 1½ lb. of the explosive without stemming at a gallery temperature of 77 deg. F.) into a mixture of gas and air containing 4 per cent. of gas and 20 lb. of bituminous coal dust, 18 lb. of which is to be placed on shelves on the sides of the first 20 ft. of the explosion gallery and 2 lb. so placed that it will be stirred by an air current in such a manner that all or part of it will be suspended in the first division of the gallery. An explosive is considered to have passed the test if no one of the five shots ignites this mixture.

An explosive is a substance, the decomposition of which results in the sudden expansion of its components into a volume of heated gases many times exceeding its original bulk. The strength of an explosive depends upon the volume of gases liberated, the rate at which decomposition proceeds, and the temperature of ignition. The gases liberated by the ignition of gunpowder, for instance, amount to about 2000 times the original volume of the powder used, and the force exerted by ordinary blasting powder has been ascertained to be about 22,000 ft.-lb. per square inch.

Black powder has been largely used in mining operations for the following reasons: It is cheap, and it is comparatively slow in action and therefore suitable for coal and soft rock and less dangerous than some of the nitro compounds. On the other hand, it is quite dangerous in the presence of firedamp and coal dust; its use is now being objected to by many experienced mining men for the reason that, if exploded in large quantities, it is dangerous to health, life and property. This is owing to the large percentage of carbon monoxide it gives off; no explosive which gives rise to this gas ought to be used for extensive blasting in mines because of this risk. Furthermore, because of the fact that it has been proved that even small traces of carbon monoxide render mixtures of coal dust and air highly explosive. This is a point frequently overlooked in experiments with explosives. For instance, on firing 1½ lb. of black powder, over 3 cu.ft. of combustible gas (consisting chiefly of carbon monoxide) would be produced, and this when mixed with pure air (apart from any consideration of coal dust) would give over 10 cu.ft. of an explosive, or at least a rapidly burning mixture.

### Chemical Changes When Using Black Powder

It would perhaps be well at this point to note the chemical change that takes place and also the gases produced when exploding ordinary black powder. Then we can make a comparison with the chemical change attending the explosion of some of the permissible explosives. In that way we may have a standard of comparison that will enable the intelligent observer to note the advantages or disadvantages of various explosives.

The approximate percentage composition of ordinary black powder is nitrate of potassium 75, carbon 15 and sulphur 10; when it is exploded 56 per cent. of solid and 44 per cent. of gaseous matter are formed. Ordinary black powder explodes at 600 deg. F. and by the explosion the following gases are produced:

| | Percentage by Volume |
|---|---|
| Car dioxide | 32.15 |
| Carbon monoxide | 33.75 |
| Nitrogen | 19.03 |
| Sulphuretted hydrogen | 7.10 |
| Marsh gas | 2.73 |
| Hydrogen | 5.24 |
| Total | 100.00 |

From this it will be seen that black powder gives off a large percentage of carbon monoxide which, as already stated, is extremely objectionable. The sulphuretted hydrogen also is highly dangerous and therefore objectionable.

A sample of mine air was taken 12 minutes after a blast of 22 lb. of a permissible explosive of the nitrocompound class. An analysis showed that the following gases were produced:

| | Percentage by Volume |
|---|---|
| Carbon dioxide | 0.08 |
| Oxygen | 20.80 |
| Carbon monoxide | 79.12 |
| Nitrogen | ..... |
| Sulphuretted hydrogen | ..... |
| Hydrogen | ..... |
| Marsh gas | ..... |
| Total | 100.00 |

*Paper read at a meeting of the Illinois Mining Institute.

The difference in the air after an explosion of black powder and then after a permissible explosive, as shown by analysis, is quite striking. It was a consideration of these highly dangerous properties of explosives more than anything else, perhaps, that induced mining men and chemists to begin to look for something else that might be used in preference to powder.

Most of the permissible explosives produced may be said to belong to one or other of the following classes: (1) Chlorate mixtures, or explosives containing chlorate of potash; (2) nitrate mixtures other than gunpowder; (3) nitro compounds containing nitroglycerine; (4) nitro compounds not containing nitroglycerine.

The term chlorate mixture means any explosive containing a chlorate. This has been divided into two divisions—one consisting of those chlorate preparations which contain nitroglycerine or other liquid explosives and the other those containing chlorate of potash.

Explosives of the second class have not been a success on account of the fact that chlorate of potash develops considerable heat on decomposition; the result being that not only is an explosive containing chlorate more sensitive as a rule to percussion and friction than a compound in which the oxygen carrier is a nitrate, but it is also more violent in its action. It may be said, however, that mere sensitiveness is no great defect since there are many methods by which this may be overcome; if this were the only failing possessed by these explosives, it is more than probable that a large number would have been on the permissible list. Unfortunately, however, especially after exposure to wide differences of temperature in the presence of moisture, the chlorate is liable to crystallize on the surface of the explosive, a condition which gives rise to a considerable increase of sensitiveness to which there is practically no limit.

A moment's reflection makes it clear that it is safer to deal with a highly sensitive explosive of which the degree of sensitiveness is known than with another which (although originally vastly less sensitive) may in the course of time develop dangers, the full measure of which we are quite ignorant.

### Some Explosives Unsuitable for Mine Use

In the second class of explosives (or nitrate mixtures) nitrate of sodium is substituted for potassium nitrate, such mixtures being cheaper; but they are so absorbent or deliquescent—that is, they take up moisture from the atmosphere so readily—that it renders them unsuitable for mining purposes.

In considering the third class, or nitro compounds containing nitroglycerine, we find they have special risks. Although many manufacturers will guarantee these compounds to be non-hydroscopic, yet such explosives contain notroglycerine in which the liquid is held merely by the absorbent qualities of the other constituents; they possess the quite serious defect, that in contact with the moisture of the atmosphere the nitroglycerine exudes owing to its easy displacement by water. This exudation is at all times undesirable and extremely dangerous as it may be precipitated in what is practically a pure state to one point and it is extremely sensitive to shock.

Again, all explosives containing even a small percentage of nitroglycerine possess the common defect that they freeze at a relatively high temperature (at about 45 deg. F.) and when once frozen do not completely thaw until the temperature rises above 50 deg. F. It is quite easy to find these explosives in sheltered magazines frozen at times when the temperature outside is fairly warm. The effect of this is twofold: First, when in this condition, they are more liable to be exploded by rough treatment; secondly, they are less easy to explode by means of a detonator with the result that there is more likelihood of unexploded cartridges being left at the back of the hole or among the coal thrown down from a shot. Moreover, they are, unfortunately, even more sensitive to friction when in a half-frozen state; the reason being, no doubt, that small portions of the semi-liquid nitroglycerine on the softened outside layers of a cartridge are liable to be crushed between two crystalline surfaces of the still frozen core or to be unduly heated by the breaking of the crystals.

### Risks with Certain Kinds of Explosives

To illustrate the risks of the third class of explosives compared with black powder, heat up a single grain of a mass of gunpowder to the ignition temperature of sulphur and the whole will explode; but until that temperature is reached, there is practically no danger, except that as the temperature rises so much the less additional heat is required to cause ignition; and the powder, therefore, becomes more sensitive to shock. But in the case of a nitro compound it is by no means necessary that the temperature should reach the ignition point for an explosion to take place. Even when thoroughly well made an explosive of this class cannot be exposed for any length of time to an elevated temperature, even though far below its ignition point, without decomposition setting in. This chemical action develops more heat, which in its turn increases the chemical action and so on, and thus sufficient heat is provided to cause an explosion.

Lastly, we have the fourth class, or nitro compounds not containing nitroglycerine. To this class belong the ammonium nitrate explosives. The good points of this group of explosives are as follows: (1) Simplicity and safety in manufacture. (2) So far as past experience goes they seem to be considerably less dangerous to handle and store than most other explosives. (3) They do not freeze. (4) They are not as a rule easily ignited by the direct application of fire, and when ignited there is no record of any explosion having resulted unless a detonator was present. (5) If they are kept too long or the cartridges are subjected to rough handling, the affinity of the nitrate for moisture soon renders the explosive harmless. (6) They are as a class relatively safe to use in mines. One objection is that to get the best results they require a large detonator, which to a certain extent is a source of danger.

In connection with the subject of explosives, I wish to state that neither the Department of Mines and Minerals of the State of Illinois nor the inspectors have any desire or intention of lending their moral or active support to any system or principle, other than the highest degree of safety consistent with the best economic and practical results.

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**Carbon ignites at about 900 to 1000 deg. F. Therefore, in burning pulverized coke or anthracite in furnaces it is necessary to use special expedients to raise the temperature of the burning fuel above the ignition point. Low-volatile fuels have been burned satisfactorily by this method.**

# Preparation of Bituminous Coal—VII

By Ernst Prochaska
Benton, Illinois

SYNOPSIS—*The problem of power transmission is one that requires careful attention. In most cases it is advantageous to drive the machines of a washery in groups with the larger units driven individually. Buildings should preferably be of steel, although wood and reinforced concrete are often employed. The costs of coal washing vary considerably with conditions of coal, quality of machinery, layout, thoroughness of process and supervision.*

IN THE earlier washeries frequently only one main-drive unit (usually a steam engine) was employed for the whole plant, or one engine drove the washery and another the screening plant. The power had to be transmitted from one point to all the different pieces of apparatus. This resulted in complicated systems of transmission machinery distributed over the entire plant. The disadvantages of this arrangement were well known, even at that time, but as long as only steam was available as the sole source of power, a decentralization of the power supply was out of the question on account of the great weight and large size of the steam engines.

The disadvantages of such a centralized power station are as follows: The great number of shafts, pulleys, belts, sprocket wheels, chains, sheaves, ropes and clutches makes the installation expensive in first cost as well as in cost of operation. The supervision of such a plant is difficult, costly and dangerous. It requires a large crew to attend to the lubrication and upkeep of all this complicated machinery. The loss of power caused by friction and inefficient transmission machinery is enormous. The swiftly moving belts, chains, ropes and shafting are a constant source of danger to the operator. The necessary safeguards are expensive and at best only a cumbersome makeshift.

It is consequently only quite natural that the direct electric-motor drive has been quickly adopted for coal washeries. This permits the installation of small independent drives, avoiding all cumbersone, expensive and dangerous transmission machinery. The small motors can easily be placed in almost any position without heavy or expensive foundations.

For centrifugal pumps and crushers the electric motor drive is especially well adapted. Electric drives permit the different units to be operated independently one from the other. They can be stopped easily and quickly by throwing a switch, which enhances the safety of the operation. The control of all motors can be consolidated on a central switchboard, so that by using a remote-control system any unit can be started or stopped from a central point. Furthermore, cutout switches can be placed at convenient points throughout the plant, so that in case of danger it is not necessary to go to the motor or the central control board. Disastrous and costly wrecks can thereby be avoided.

The starting apparatus of the different machines forming one unit can be connected in such a way that it will be impossible to start one machine before the following one has been put in operation or, vice versa, to stop a machine before the preceding one has been shut down. This, in case of crushers, elevators and conveyors will avoid choking up any piece of apparatus and spilling coal. It is easy to make the operation of an electrically driven plant foolproof by taking the successive starting of the separate pieces of machinery out of the hands of the machine operator.

The starting apparatus should be provided with an overload circuit breaker so that in case of a jam in the machinery, wrecks or burnouts of the motors will be avoided. No-voltage releases ought to be installed also,

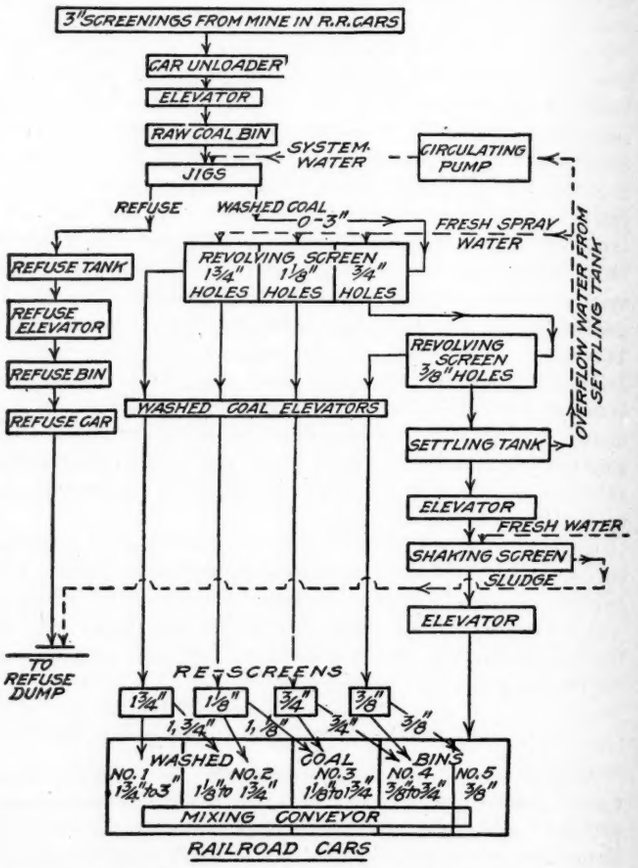


FIG. 25. FLOW SHEET FOR A FUEL COAL WASHERY TAKING SCREENINGS FROM A DISTANT MINE

so that in case of a sudden failure of the power supply the motors will not start when the power comes on again. It should be possible to lock the starting apparatus, to provide a safeguard for the men repairing the machinery.

Slow-speed motors are in most cases advisable on account of the extra expense and increased loss of power caused by speed-reducing gears. Constant-speed motors with a good starting torque should be employed, except for elevator and jig drives where a variation of speed is sometimes required. Washed coal and refuse elevator drives should be designed to permit the reducing of the elevator speed for short periods.

The only disadvantage of electric-motor drive encountered in actual operation arises from the inability to change the speed within the limits sometimes re-

quired in the operation of a washery. It is necessary to slow down the greater part of the machinery at certain intervals to permit a careful and thorough inspection. For this purpose the speed of the machinery should be reduced at least to 25 per cent. of the normal working speed. With steam engines as main-drive units the speed of the machinery can be reduced to almost any degree and the starting and stopping can be accomplished without exposing the machinery to sudden stresses and shocks.

The question remains, How far should decentralization be carried? To install a separate motor for each piece of apparatus would require an undesirable number of small motors, which would increase the cost of installation out of all proportion to the advantages gained thereby. The whole electrical equipment would become complicated and the control unwieldy.

It will be far more advisable to combine the drives for a group of machinery, making thus one drive unit, if one motor can actuate it by means of simple, conveniently arranged transmission apparatus. This is especially the case with jig drives. Therefore, we must consider in the selection of a proper drive the following: The degree of decentralization depends upon the space at disposal. This sometimes requires a fixed arrangement of the machinery, regardless of the convenient arrangement of the drives. In some cases, however, it will be possible to consider the most convenient and economic drives, regardless of other requirements. Therefore, generally speaking, no special method of driving can be pronounced as the best. Each separate case demands its particular solution and the number of motors to be installed will vary from 6 to 35. In the simplest case the motors can be arranged into groups as follows: (1) Raw-coal elevator and preliminary screening; (2) all the jigs, the washed coal and refuse elevators; (3) sizing screens; (4) washed coal conveyors to the bins; (5) circulating pump; (6) sludge-handling and water clarification.

In the most complicated case, where the decentralization has been carried to extremes, we find the following: (1) Docking table; (2) coal conveyors to crusher; (3) feeders under unloading hopper; (4) cross conveyor from unloading hopper; (5) conveyor for foreign coal to crusher; (6 and 7) crushers; (8) conveyor to raw-coal storage bin; (9) reclaiming conveyor under storage bin; (10) conveyor to screen house; (11 and 12) sizing screens; (13, 14 and 15) conveyor for sized coal to equalizing bins; (16 and 17) jigs; (18 and 19) washed-coal elevator (20) refuse elevator; (21, 22, 23 and 24) dryers; (25) washed-coal conveyor; (26 and 27) circulating pumps; (28, 29 and 30) sludge pumps; (31, 32, 33, 34 and 35) thickeners; (36) concentrating tables; (37) laboratory crusher.

The horsepower of the foregoing 37 motors varies from 7½ to 250, and two voltages are used—that is, 440 and 2300—besides the lighting circuit of 110 volts.

## Buildings and Structures

Timber construction is rather antiquated and undesirable on account of the fire risk. Only in certain cases, where the acreage of the mine will not promise a long life, it will be excusable to use timber in the construction of a washery. But even then the danger of fires must be considered. Such fires, even when the washery is fully insured, entail a lengthy interruption to operation and a consequent loss of profit, or even the loss of a desirable customer.

In addition to this, timber construction, on account of the larger size of timbers necessary, narrows down the space at disposal and the great number of joists, beams and braces interferes with the passageways and

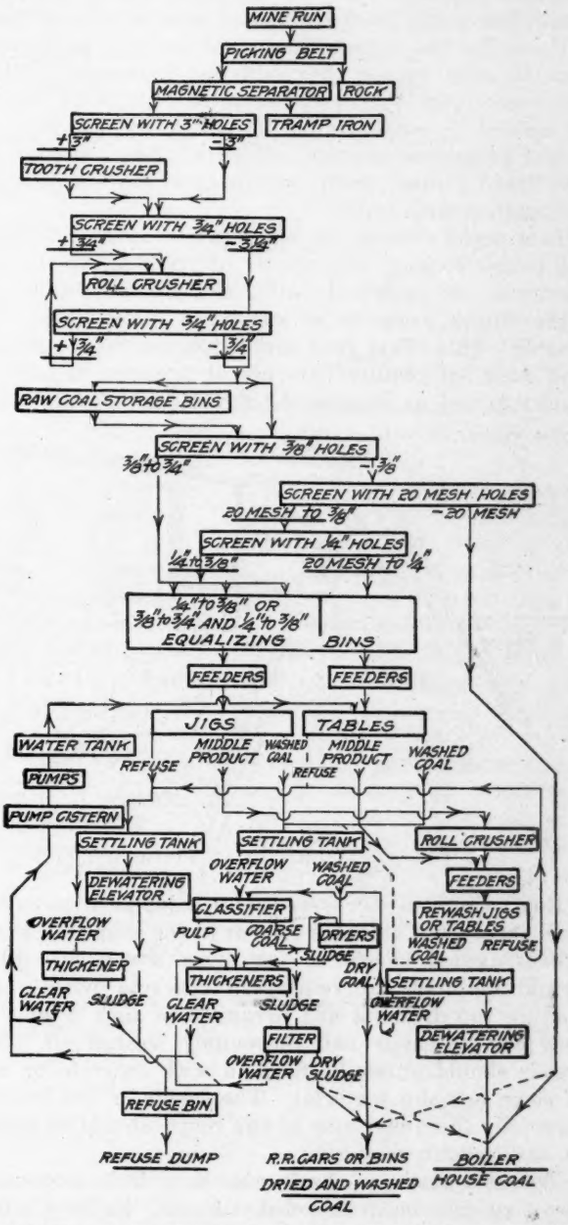


FIG. 26. FLOW SHEET FOR COKING COAL WASHERY

the convenient supervision of the plant. Reinforced concrete for the building proper is expensive and has the further disadvantage that changes and additions cannot be made except at great cost and under difficulties.

For tanks, sluiceways and bins, reinforced concrete is supreme. In connection with this it may be stated that concrete sluiceways ought always to be lined with glazed terra-cotta tile to resist abrasion. For the construction of the housing over the machinery, steel is the only feasible material. A steel structure makes a light, rigid and durable building, permitting the location of plenty of windows and ventilators. Daylight is the cheapest item we have at our disposal, and it should be used freely. Machinery supports can be arranged

easily, and floor beams, stairways and walks conveniently placed to provide accessibility to all parts without obstructing the view.

For the covering of the buildings we have a great variety of materials, so that the proper selection will depend upon the climate, the money available and the personal preference of the designer. Under ordinary conditions galvanized corrugated steel sheets are quite suitable for the sides of the buildings. If painted and kept in good repair, they will last a reasonable time; but even under the most favorable conditions the cost of upkeep is considerable, and they do not give sufficient protection in colder climates. The increased cost for heating may easily overbalance the cheapness of corrugated steel siding.

In a warm climate the sides can be arranged in sliding panels so as to give plenty of fresh air in the summertime. In colder climates, and for durability, concrete stucco work on an expanded metal base is advisable. This offers good protection against the weather and does not require painting or frequent repairs. It ought to last as long as the steel framework.

A guarantee for a certain amount of ash in the washed coal is only to be considered if at the same time a certain yield is also guaranteed. The cost of operation is an important factor. An indisputable guarantee should read: With $x$ cents cost of operation per ton of such and such a coal handled we guarantee an output of $y$ per cent. with $z$ per cent. of ash in the washed product.

To check these figures it is necessary to take average samples of the different products and analyze them. Therefore, a laboratory is a necessary appendage to a washery. Daily samples ought to be taken, the ash and sulphur contents determined, also the percentage of "sink" in the washed coal and the percentage of "float" in the refuse. These results ought to be posted on the jig floor so that the jig runner can see what he is doing.

The cost of operation depends upon the character of the raw coal, just as the yield and the percentage of ash and sulphur in the washed coal depend upon it. But the cost of operation is furthermore influenced by the arrangement of the washery and the supply and appli-

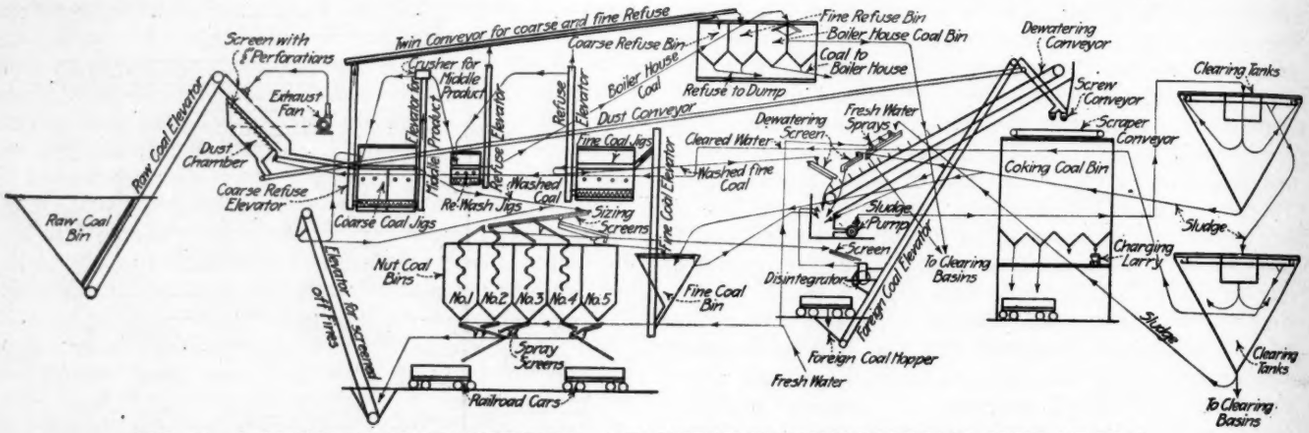


FIG. 27. A PICTORIAL FLOW SHEET FOR A WASHERY TREATING SEVERAL SIZES OF COAL

Roofs can also be covered with galvanized corrugated steel sheets, but asbestos cement in the shape of shingles or corrugated sheets is far more advisable. Floors should be made of reinforced concrete with a non-dusting top dressing and arranged in such a way that they can be easily and thoroughly washed off. Stair treads should either be filled in with concrete or made of some non-slip material. The inside of the building, especially the under side of the roofs, should be painted in, say, a light gray color.

The idea that a washery must be a dark, sloppy place has long ago been exploded. A coal washery can be made just as clean and light as any other industrial building. Plenty of light not only means convenience but also safety. Dark corners are tabooed in modern construction. The ideal design should permit the unobstructed supervision of all machinery from one point. The main requirements to be considered in the design of a washery building may be condensed as follows: The building must give sufficient protection against the inclemencies of the weather; all vibration must be taken care of; all the machinery must be in full and unobstructed view from preferably one but in any case as few points as possible; all machinery must be safely, fully and easily accessible; artificial lighting should only be required during the nighttime; no dark corners should be permitted; changes in the arrangement of the machinery must be easily accomplished.

cation of power and water. General conditions only can here be considered, as each separate case must be handled in a different way and individually. Weekly or at least monthly cost sheets on a per unit (ton of input) basis are of great value, especially as the comparatively simple operation of a washery permits an easy and correct subdivision of the cost for all separate operations. By carefully studying and comparing the figures obtained valuable information can be gained which will be a guide in making changes in the method of operation. It is therefore judicious to arrange the cost sheets according to the different units of operation, so that we get the cost of each step of the process separately.

## ANALYSIS OF EXPENSES

The cost of operation must be divided into fixed charges, operating expenses and the cost of special work. It is only natural to keep the cost of installation as low as possible. This effort in economy is limited, however, by the necessity of keeping the cost of operation and that of repairs as low as possible. If one operator can be saved by a certain increase in the cost of installation, this increase will be justified if it is lower than the capitalized wages of the operator. This is because it is desirable to become as far as possible independent of the imperfection of human labor.

The regular cost of operation includes wages, cost of power, water, light and lubricants. In regard to the

cost of power and water we must consider that they depend in many cases on the more or less perfect operation and efficiency of the machinery. An increase in the cost of power and water, if it brings about a cleaner washed coal, is commendable if this increase remains below the possible better price obtained for the cleaner product.

The cost of special work includes wages and cost of material for repairs and renewals. While the above-named cost can at least partly be predetermined, that of repairs appears only in the course of time, after the washers have been in operation. To arrive at the exact cost of repairs is difficult. Depending upon the time used for repairs, the absolute expense is much higher than the cost of labor and material expended, because we must take into account the loss incurred through the interruption of operation of the washery, which may in some cases reflect even upon the operation of the mine.

The breaking down of an elevator, with the bins full and no spare parts on hand, may be given as an example. Therefore, all important machinery ought to be fully guaranteed by responsible manufacturers as a safeguard against interruption of operation. This may, however, bring about an increase in the cost of installation, influenced by the heavier and better constructed machinery.

The cost of washing coal shows just as many variations as everything else connected with a washery. The following figures, however, can be given as an approximate guide:

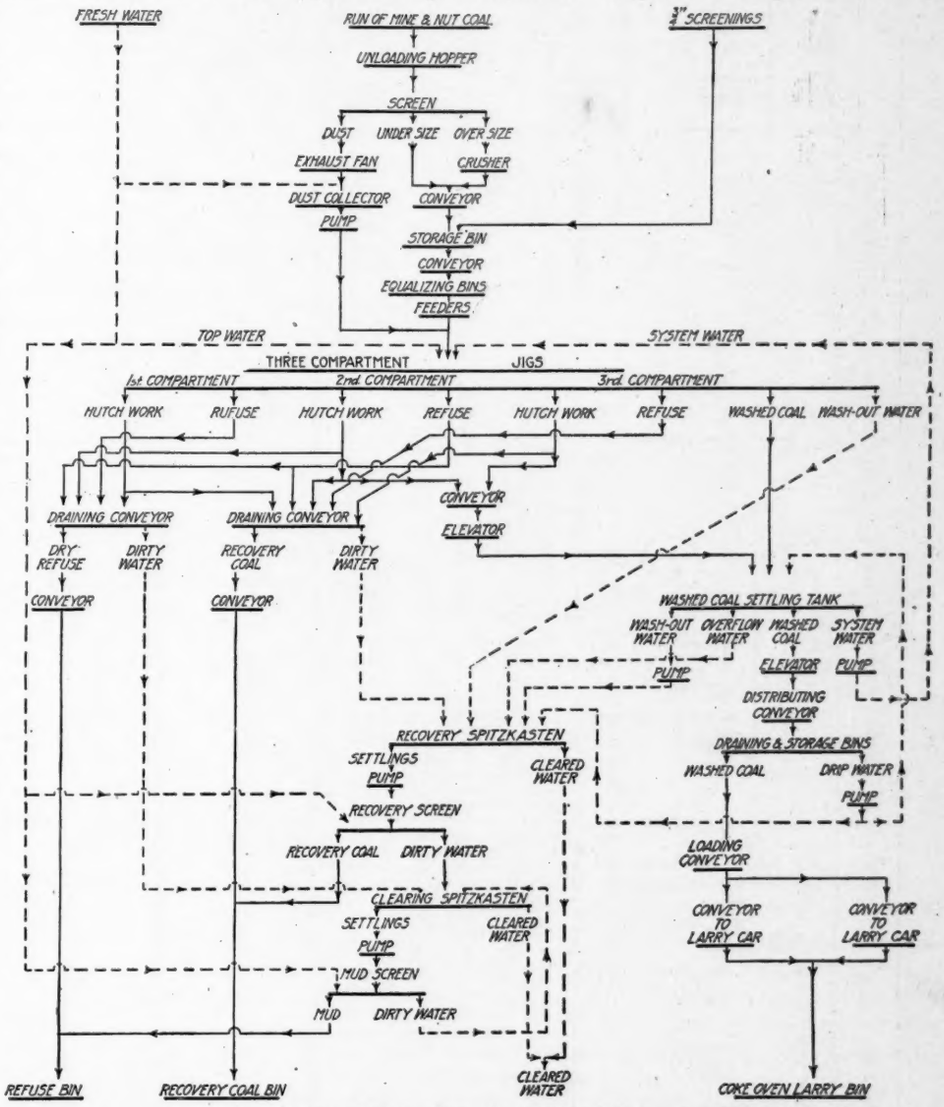


FIG. 28. FLOW SHEET FOR A COKING COAL WASHERY

| | Cost per Ton of Raw Coal Minimum, Cents | Maximum, Cents |
|---|---|---|
| Amortization and interest of capital invested | 3 | 5 |
| Cost of operation (wages, power, water, light, stores) | 8 | 20 |
| Cost of repairs | 2 | 5 |
| Total | 13 | 30 |

To the foregoing figures, however, must be added the cost of shrinkage, which will depend upon the amount of impurities in the raw coal and the degree of cleaning—that is, upon the yield. I have operated different washers making from 10 per cent. to 33 per cent. refuse.

## General Arrangement of Washeries and Graphical Illustration of the Process

The design of a coal washery is a complicated problem on account of the extremely numerous factors influencing the arrangement. This becomes still more complicated when the separate requirements become contradictory. We have in the foregoing chapters fully discussed which requirements should be considered and which should be given preference. Drawings for a washery can be made in different ways, depending upon the purpose for which they are intended.

If it is only necessary to get an idea of the methods used and the succession of the operations, plain flow sheets will suffice. Flow sheets are of great help for preliminary estimates. They are indispensable when the operations become complicated, in order to comprehend quickly the correlation of the different processes. In Figs. 25 and 26 two flow sheets are shown. One for a fuel-coal washery taking 3-in. screenings from a distant mine and the other for a coking-coal washery directly connected with the mine. The flow sheet for the fuel-coal washery illustrates the operation of the washery shown in Fig. 29.

In Fig. 27 a different kind and more elaborate type of flow sheet is shown for a washery making five sizes of fuel coal and a coking coal at the same time. In this flow sheet the different pieces of machinery are shown in outline and the separate units are shown in nearly the same juxtaposition as they are placed in the washery.

In studying this flow sheet we find: That the dry screened-off dust can be mixed directly with the washed fine coal. The middle products from the coarse coal jigs can be carried, according to their composition.

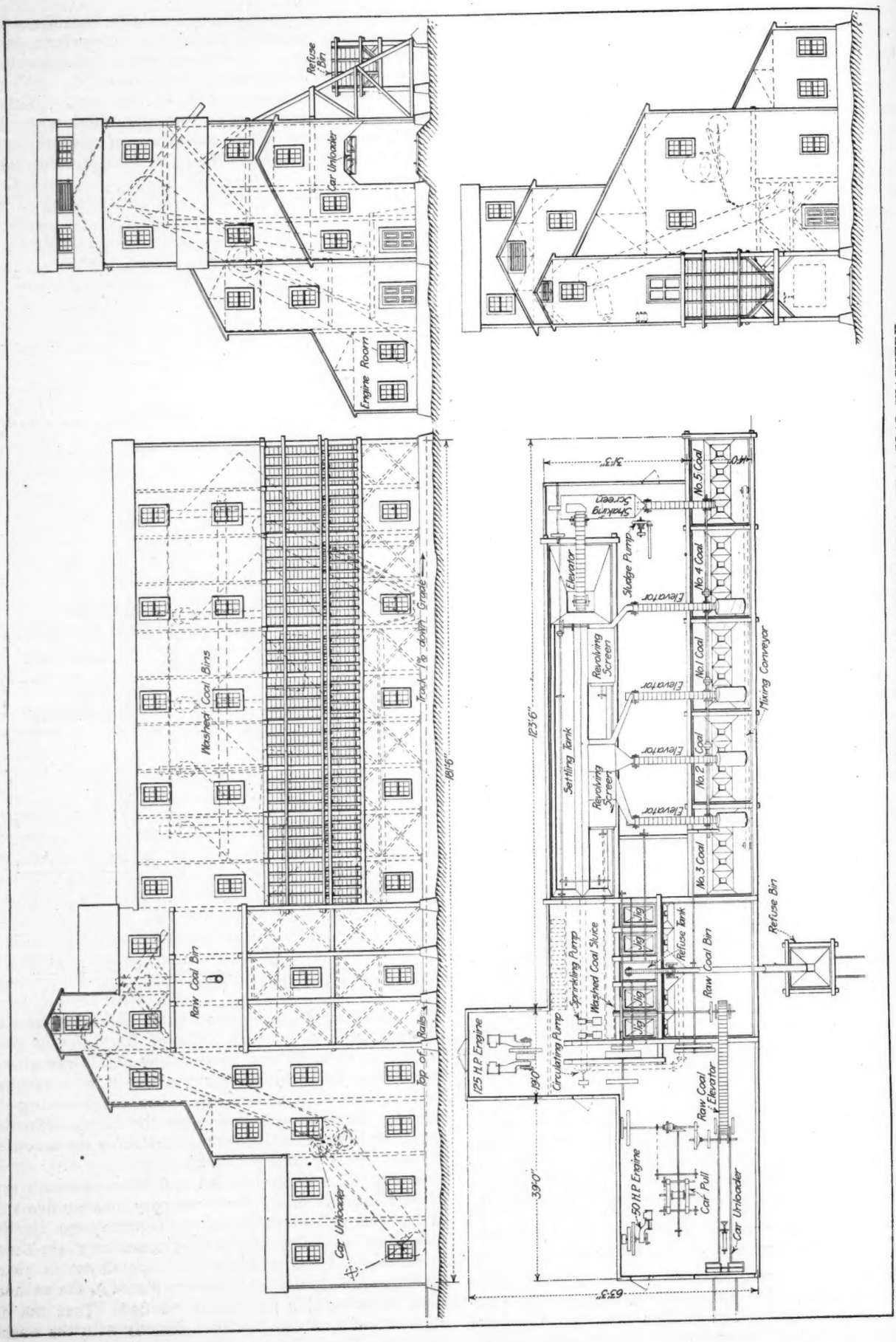


FIG. 29. SHOWING THE GENERAL PLAN AND ELEVATION OF A COAL WASHERY

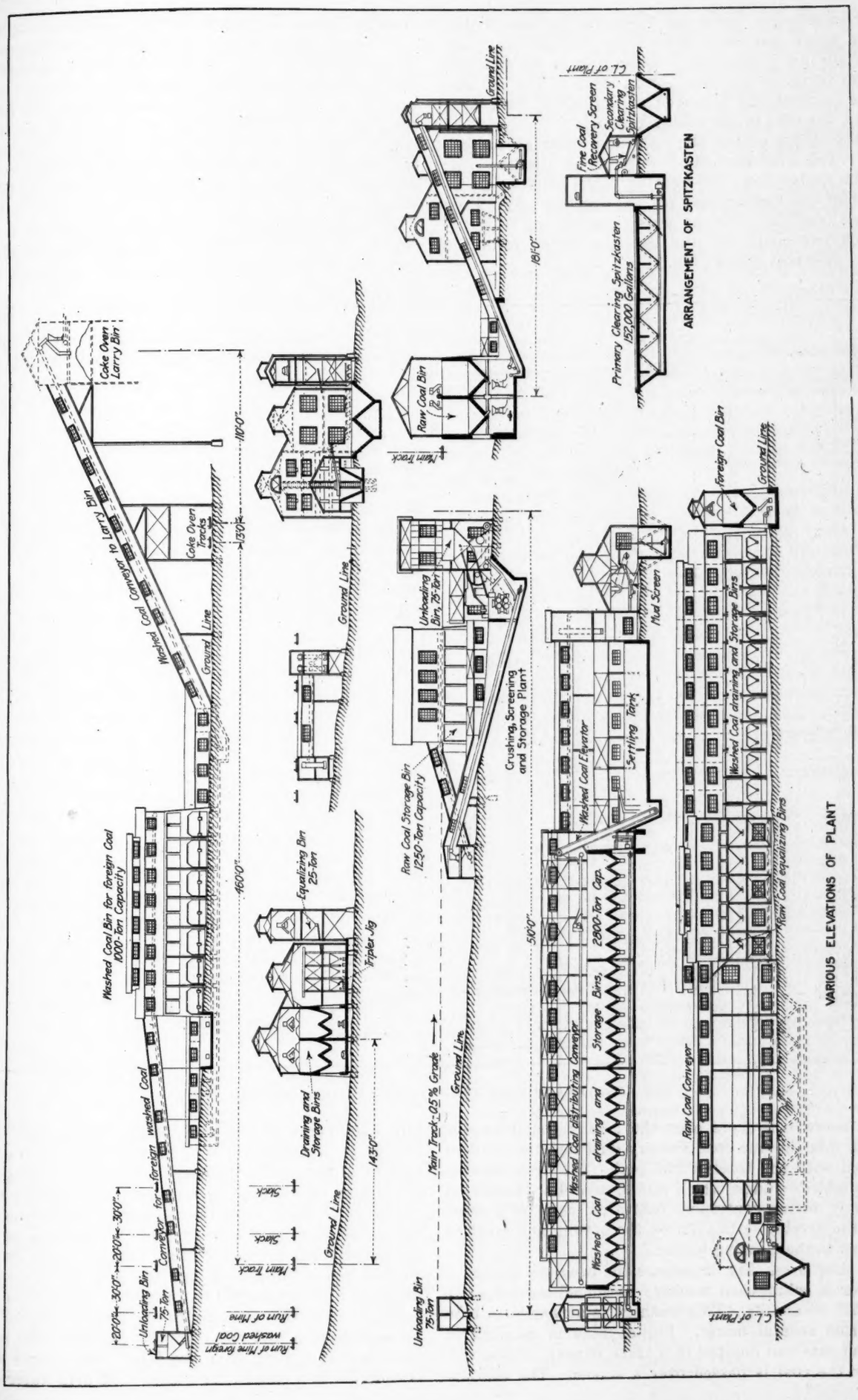


FIG. 30. DETAILED VIEWS OF THE VARIOUS ELEVATIONS OF AN ELABORATE COAL WASHERY

either back to the coarse coal jigs or to the rewash jigs. In the latter case only boiler-house coal can be made. If the amount of fine coal, screened out, is not sufficient for the supply of the coke ovens, some of the nut coal can be crushed and delivered in connection with some foreign fine coal to the coking coal bins.

In the sludge cistern the following materials are collected: (a) The drained-off water from the fine coal; (b) the sludge from the clearing tanks after being filtered through the screens; (c) the overflow water from the fine coal bin; (d) the water drained off from the crushed nut coal; (e) the overflow water from the boiler house coal storage bin.

from the screen is crushed and the crushed and screened coal is put into a storage bin, which also receives the screenings from other mines. From the storage bin the coal is conveyed to the equalizing bin, located in the rear of the jigs. From here feeders carry the coal to the jigs. At the feeders the dust collected at the screen house is mixed in with the coal. The jigs are three-compartment machines, making three products, which, depending on their composition, can be treated in different ways.

From the washed-coal settling tank the coal is conveyed to a series of draining bins to be dewatered, and from these bins it is conveyed to the coke-oven larry

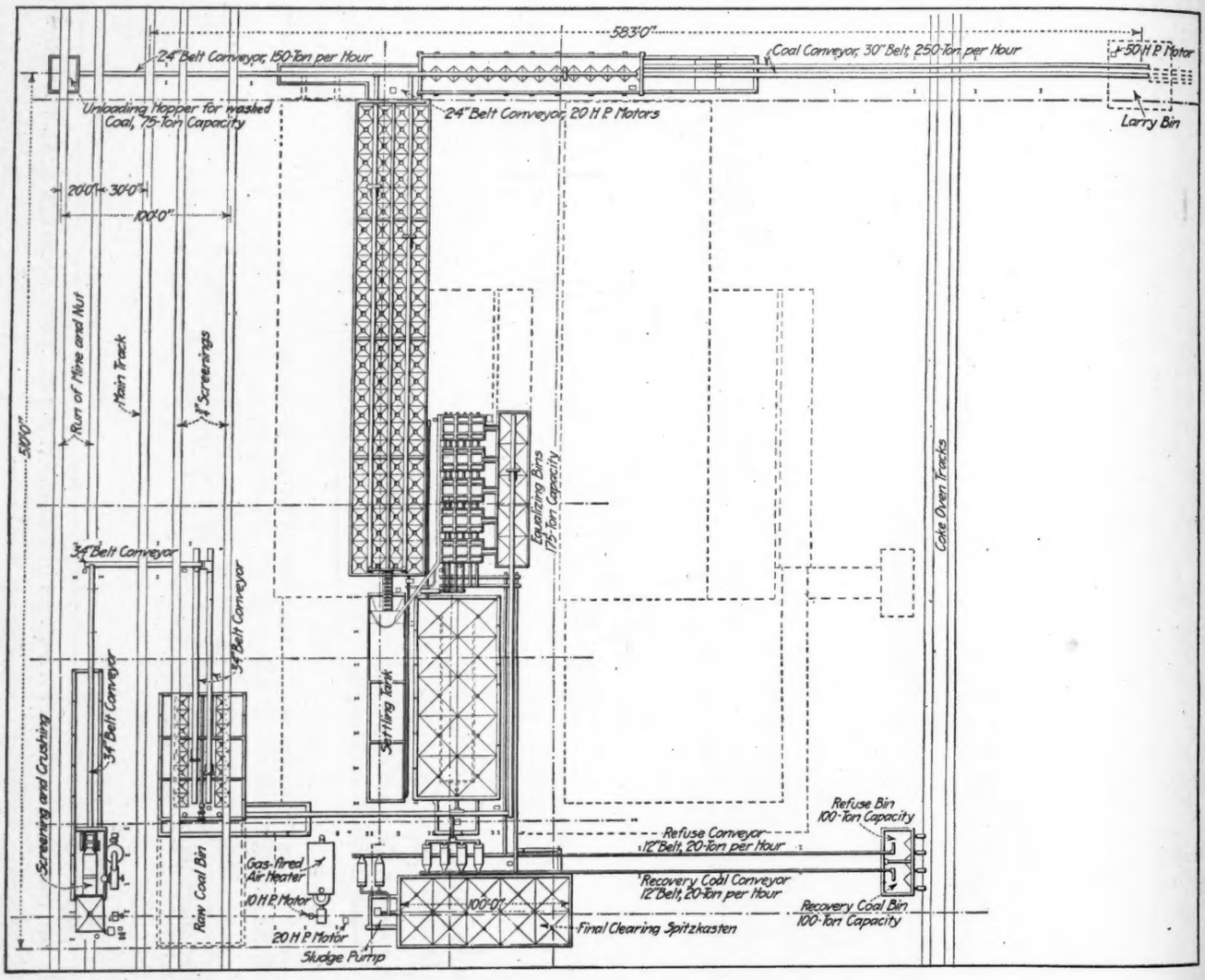


FIG. 31. PLAN OF A WASHERY WITH FLOW SHEET FIG. 28

The screw conveyors over the coking coal bins are used to mix the fine coal, the dry dust and the crushed nut coal with the foreign fine coal. The first clearing tank produces sludge, which can be used, but the second tank only during continuous operation, as after a shutdown the fireclay settles out on the bottom and must be removed to the clearing basins.

The flow sheet, Fig. 28, shows the progress of operation for a coking-coal washery arranged according to Figs. 29, 30 and 31. This washery is arranged to take coal from several mines. Run-of-mine is received in railroad cars and dumped in a track hopper. From this hopper the coal is passed over a screen. The oversize bins and thence to the coke ovens. The refuse is deposited in a refuse bin and carried away in railroad cars to a dump. The recovery coal, after passing over a draining or dewatering conveyor, is stored in a bin.

The dirty water from the recovery-coal draining conveyer, the overflow water from the washed-coal settling tank, the wash-out water from the jig tanks and the washed-coal settling tank, and the drip water from the draining bins is collected in a recovery *spitzkasten*. The settlings from this *spitzkasten* are further treated on a recovery screen and the resulting recovery coal mixed in with that coming from the jigs. The cleared water is collected in a cistern for reuse. The drip water from

the draining bins can also be conveyed back to the washed-coal settling tank.

The dirty water from the refuse draining conveyor and the recovery screen is treated in a clearing *spitzkasten*. The settlings pass over a mud screen. The resulting mud is mixed with the outgoing refuse and the dirty water from the screens carried back to the clearing *spitzkasten*. The cleared water from the *spitzkasten* flows to the clear-water cistern. The circulating pump takes the water from the washed-coal settling tank and puts it back under the jigs. Fresh water is supplied to the dust collector, the jigs, the recovery and the mud screens.

# Care of Scales and Correct Weights

## Proper Care of Scales Is the Chief Consideration in Securing Correct Weight—Importance of Keeping Platform Interstices Free of Coal

BY E. C. DODGE
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THE first requisite for the correct operation of a track scale is cleanliness. Platforms should be kept clean and free from bind in all interstices next to the coping. A great help in this respect is to have all the interstices covered with 6-in. iron, or with belting fastened to the coping in such manner as to enable one to raise the covering on the scale side when this becomes necessary. These coverings, if properly placed, make it possible to sweep the scale platform without the dirt falling into the pit at the side.

As nearly as possible, rails should be kept 1 in. apart at each end; they should never touch. On a scale with an inclined deck, it is quite a problem to keep the rails in position. Many devices have been invented to accomplish this, but the best one, in my experience, has been the use, on each side of the rails, of straps about 4 or 5 ft. long, bolted to the rail at one end and provided with several holes in which lag screws long enough to rench into the bearing timber are used. Lags ⅝ x 6 in. are the best size.

The approach rails at the upper end of the scale should not be higher than those on the scale platform. The absence of this condition is probably the cause of more trouble with scales than any single irregularity to which a scale is subject.

If the approach rails are too high, they cause the car to drop onto the scale; and while this not only stresses the pivots in the bearings immediately below, the jar is transmitted through the entire length of the scale and disturbs the whole adjustment.

The rails on the scale should be at least ¼ in. higher than the approach rails, for when the wheels strike the scale rails these rails naturally settle from ⅛ to ¼ in., regardless of how rigid the construction may be.

The height of the rails at the lower end of the scale, while not so important as at the upper end, should be kept as nearly that of the adjacent track rails as possible.

The pit of a track scale should be kept clean of coal, snow and water. Moisture is highly detrimental to the keen edges of pivots at points of contacts, since it soon causes these pivots to rust and they thus lose their sensitiveness. Rust and any accumulation of dirt in and around the articulated points of bearings should be removed at least once a month. To do this properly it is necessary to employ a jack screw in order to raise the levers so that the bearings are free to move. The dirt can then be cleared away by means of a pointed hook; also, a small hand bellows may often be used to advantage. The presence of rust in the bearings is often the main cause of irregularities in weights, as a knife-edge pivot is subject to change of position on a concave surface; and if impeded in its movement by an accumulation of rust, this will relatively change the fulcrum of the lever sufficiently to cause a variation in indicated weight.

Because of its delicate construction, the beam of the scale needs careful attention. The sliding poise on a tipple beam should not be bumped or thrown back to zero, so as to strike against the block at this point, as it only takes a few blows against the bumper to make a dent in the soft brass poise, allowing it to remain back of zero when balancing the scale and changing all weights in a like proportion.

The scale beam should (and can) be kept clean by rubbing it every day with soft tissue paper so as not to scratch the brass. The notches on a track scale beam should be kept free from dust and dirt with the aid of a small brush. The rollers on the poise should be oiled once a month, as this will preserve the easy manipulation of this weight.

Much more care must be exercised in weighing on a beam connected with knee lever extensions, as the extra vibration in the rods will not allow the beam to act as quickly as will a direct connection to the scale.

The fact that a beam will balance properly is not always indicative of the accuracy of the scale. All articulations must be in proper position, and loops and bearings plumb and level.

The load weighed must not be equal to, or greater than, the capacity of the scale; if it is, it will have a tendency to shorten the life of the scale by straining the levers and stretching the loops and connections, which are guaranteed to resist only a certain weight.

## *Legal Department*

SCOPE OF TIMBER RIGHTS—A coal-mining lease conferring the "right to use the timber standing on said land" will be construed to grant the lessee the right to use timber only for mining purposes, unless broader powers are conferred on him in unmistakable terms. (West Virginia Supreme Court of Appeals, Paxton Lumber Co. vs. Panther Coal Co., 98 Southeastern Reporter, 563.)

INJURIES TO MINOR MINERS IN ALABAMA—Under the laws of Alabama an owner or operator of a coal mine is liable for injuries to a child under sixteen years of age while employed in connection with a mine, coal breaker or coke oven. But where a mine is operated by one other than the owner, the latter is not liable for such injuries where he has not retained control over operations to such an extent that he could have prevented employment of the child. (Alabama Court of Appeals, Sparks vs. Brilliant Coal Co., 81 Southern Reporter, 185.)

WRONGFUL MINING OF COAL—One who innocently mines coal under the land of another is liable only for the fair value of the coal in place, and not for its value at the tipple less the expense of mining and conveying it there. To justify assessment of treble damages under the Pennsylvania statutes as for wrongful removal, it must appear that the trespass was conscious. Individual owners who had no knowledge that a trespass was being committed cannot be held liable for treble damages because their coal in place. (Pennsylvania Supreme Court, Matthews vs. Rush, 105 Atlantic Reporter, 817.)

# Résumé of Theories of the Origin of Coal

By C. W. Hippard
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SYNOPSIS—*Many theories have been advanced concerning the origin of coal, some people especially holding that the various beds now rest where the vegetable matter from which they were formed originally grew. Others believe that the coal beds are the result of drift. It is quite probable that all coals were not formed in the same manner or by identical processes.*

IN THE early days it was believed that coal had an inorganic origin. According to this theory mineral bitumen, petroleums and asphalts were erupted from deep-seated sources and flowed over the surface of the ground or upon the floors of lakes and estuaries. Later these layers were covered with sediment. The presence of plant impressions was explained by the hypothesis that as the bitumen was deposited it incrusted these fragments that were present at the time of the flow.

The ash in the coal was accounted for by the mineral matter that would be picked up by the bitumen as it came through sandstones or as it rolled over the surface of the ground. This is possible, for we have a similar condition at the asphalt deposits of Trinidad.

The arguments against this idea are overwhelming. No dykes or pipes of bitumen penetrating the rocks associated with the coal beds have been found. Coal is quite unlike bitumen in both its chemical and physical properties. Also, if plant remains were preserved in bitumen, we would expect to find bitumen which had penetrated into the cells and interstices which have been preserved. This, however, is not the case.

### Combination Vegetable-Volcanic Theory

Daddow and Bannon, in their "Coal, Iron and Oil," published in 1866, give a very interesting account of the vegetable-volcanic theory. They believed that the vegetation of the carboniferous age was of "the most vast and magnificent description, in comparison with which the most luxuriant of the present day would be as a 'drop in the bucket.' This was brought about by a soft and fertile soil, made rich with the decaying matter of ancient marine life and the resulting bitumen of the carburetted hydrogen gases, the atmosphere, warm and moist with heat and steam, and loaded with life-giving carbon dioxide so necessary to vegetable life."

Their greatest proof lies in the fact that they give nature the credit of being "a rapid worker and a wonderful chemist, instead of being slothful, mutable, complex, and time-serving." Other proof advanced is that the carboniferous rocks contain no fossils of animals or birds because the atmosphere would not sustain life. Tyndall made the statement that an atmosphere high in $CO_2$ would readily pass solar heat rays, but would not allow heat to radiate.

Early writers say that this luxuriant vegetation did not appear to form coal in a direct manner, but that the carbon it contained was distilled or expelled by pressure and heat, probably from volcanic origin, in the shape of oil, which must have been a carburetted hydrogen; and this would form coal.

This idea has at the present time been so thoroughly discarded that it is unnecessary to go into discussion of it. It might be well, however, to give a few of the points used to disprove the luxuriant vegetation idea. At the present time we have peat bogs in the course of formation, so it is not necessary to the vegetable origin of coal to assume that only in tropical climates could so much vegetation flourish. It can hardly be imagined that similar conditions of climate prevailed over vast areas, ranging from Greenland to India, occupied by carboniferous strata. In some cases thick coal beds are found scattered in different parts vertically of the earth's crust, and it is difficult to maintain that for coal formation a tropical climate was necessary.

### Coal Is of Vegetable Origin

At present the theory that coal is of vegetable origin is almost universally accepted. This view is based on the fact that there is an intimate gradation existing between vegetable accumulation now in the process of formation and coal. Uusually by a series of slow changes the vegetable remains are transformed to coal, although it is possible that this action may be quickened by extreme heat and pressure. The following names are given to the products of successive stages of the process: peat, lignite, sub-bituminous, bituminous, semi-bituminous, semi-anthracite and anthracite. It is to be noted that these divisions are not sharp, but each grades into the one following.

The characteristics of each grade are as follows:

*Peat.*—This material, which represents the first stage in coal formation, is formed by the growth of plant life in moist places. A vertical section in a present-day peat bog would show on the top a layer of living plants, and below this a layer of dead plant remains which grades into a layer of dense, brownish black peat more or less jelly-like in character. Here the vegetable structure is often indistinct, and the carbon content is much higher than in the top layer of living plants.

*Lignite*, also called brown coal, represents the second stage in the coal formation. It is usually woody in texture, brown in color, and has a brown streak. The heating value is rather low, and the substance burns with a long smoky flame.

*Sub-bituminous coal*, or black lignite, represents an intermediate stage between lignite and bituminous coal. It is usually glossy black, rather free from joints, and has a heat value of from 7500 to 10500 B.t.u.

*Bituminous coal* represents the fourth stage in the series. It is more dense than the lignites, has a deep black color and is comparatively brittle. Sometimes it shows traces of vegetable remains, and under the microscope traces of woody fiber are seen. Cannel coal is a compact variety of non-coking bituminous coal. It contains a high percentage of volatile hydrocarbons, and because of this ignites readily.

*Semi-bituminous and semi-anthracite* are terms applied to those coals the volatile matter of which has been reduced to from 12 to 22 per cent. and to less than 10 per cent. respectively.

*Anthracite* represents the last stage in the production of coal. It is higher in fixed carbon and lower in volatile hydrocarbons than the preceding types.

While it is true that the foregoing classification may not be as complete as some think it should be, it is believed that for the purpose of tracing the formation of coal through successive stages it is sufficient.

### Accumulation of Vegetable Matter

As previously stated, most geologists and others agree that coal was formed from vegetable matter; but they differ on the way in which the formation was brought about. These differences with respect to the accumulation gave rise to two prominent theories, the *in situ* and the drift theory.

By the *in situ*, growth-in-place, or antochthonous theory, is meant that the coal was formed at that place where the plant life grew. The following points have been advanced in support of this idea:

1. Upright carbonized tree trunks found in the coal seams of some localities, the roots of which extend into the lower clay, are believed by some to favor this theory.
2. Present day peat bogs and swamps, for example the Dismal Swamp of Virginia and North Carolina.
3. Perfect preservation of many plant remains, a condition unlikely to exist if plants were transported.
4. The purity of many coal beds that extend over large areas; for if the vegetable matter was transported it would have been mixed with earthy sediments, and the interstices of large trees partially decayed would have been filled with pebbles, sand, etc.
5. Uniform thickness of beds of coal over vast areas.
6. Clay bed under coal is often found with roots in position of growth.
7. The layer of rock overlying the coal bed often contains abundant remains of vegetable matter. This tends to prove that sediment was deposited first amongst, then on top of the vegetation.
8. The vegetable matter of coal beds is made up of trunks, small stems, leaves and fruit intermingled in such a manner as to make it seem as though the vegetation grew in place.

By the drift, transportation or allochthonous theory, is meant that the remains of plant lift were transported by water to a place where it accumulated in the form of a drift. The arguments advanced in favor of this idea are as follows:

1. Distinct line between coal as found and the underlying bed, which is often clay.
2. Plant life remains usually found lying horizontal.
3. Present day river drifts and delta accumulations.
4. Some known deposits of coal occur as thin wedges or lenses.
5. Fayol clearly established the validity of this theory in deposition of coal in deltas in some of the freshwater basins, like that of Commentary in Central France.
6. Macerated and ground-up plant material are not rare in carboniferous rocks, and current bedded shales have been noted.
7. The splitting of coal seams by shale or other material is said to favor this theory.

(a.) It is believed by the adherents of the *in situ* theory that the fireclay beneath the coal bed was originally the soil on which the vegetal matter grew. Opponents of this theory have pointed out that all coal beds do not rest on fireclay. This clay seam, with the inclosing stigmariæ may be in the coal, above it, entirely out of contact with the coal, or missing altogether. The thickest coal beds often rest upon the thinnest clays, and meager coal beds may lie on thick beds. There is usually a sharp dividing line between the clay and the coal, for the clay does not grade into coal.

The *in situ* school say that the amount of clay has no relation to the thickness of the coal bed, for other conditions influenced this, and it has been pointed out that a soil is not absolutely necessary for the growth of some plant life in peat bogs, for at the present day some bogs are resting on a sand base without a layer of soil.

(b.) Upright carbonized tree trunks have been found, although they are exceedingly rare. The *in situ* school regard this as good evidence in their favor; but it is, however, a much disputed point whether this is always a safe conclusion or not. It is quite possible that the stumps observed may be *in situ*, but it must be remembered that a drifted trunk will often remain upright, for its center of gravity is sometimes so low that it is situated at the thickened base of the trunk.

Then, too, even though it is granted that the very few upright tree trunks that have been found grew in place, there is no valid reason why the remaining material could not have drifted to a place where a few trees grew. The exceedingly rare occurrence (where they ought to be common) of coal made of forest trees with their roots the stigmariæ is advanced to prove that the trees did not grow there, and it strengthens the argument against the *in situ* formation at all events from trees.

(c.) The lamination of coal beds in horizontal layers is thought by some not to afford any proof of growth *in situ*. For they argue that if trees grew there they should interfere with this horizontal banding. However, certain peat mosses in Scotland show successive layers of material due to a change in the dominant form of plant life.

(d.) The presence of occasional boulders and pebbles of quartzite and quartz in some of the underclays in Leicester and South Derbyshire, and the occasional quartzite boulders found in coal beds tend to support the drift theory.

### Fresh-Water and Marine Conditions

Geologists are further divided on the question of whether this deposition took place in fresh-water areas or under marine conditions. A few of the ideas advanced on each side are (No. 1, fresh water; Nos. 2, 3 and 4, marine):

1. Coal-forming plants of fresh-water character.
2. Strata of rocks known to be formed by marine deposition as shown by fossils are often between the coal beds and overlie the coal.
3. Brackish water molluscs are found in some rocks of the coal basins.
4. The coal strata show a marked parallelism and a frequency of salt-water invasion.

Some geologists admit of both of the preceding ideas and classify the coal as formed into two classes: limnetic, accumulated in fresh water; and paralic, accumulated in salt water.

Dowling advances a theory to explain the actions which take place in the formation of coal from peat which is worthy of consideration. When the plants die they lose the power to form oxidized hydrocarbons, therefore chemical action sets in with the formation of other compounds of oxygen and carbon. The escape of some hydrocarbons leaves the material in a rather unstable condition and loss of marsh gas follows. If fermentation accompanies decay, new hydrocarbon compounds are formed and the reduction of oxygen is accomplished without great loss of hydrogen. When the mass is solidified by superposed load, as it is when the whole sinks below the water and layers of rocks are formed from deposition of sediment, the fermentation is arrested and pressure with resultant heat causes the subsequent alteration. Pressure favors the combination of oxygen with carbon or hydrogen. Heat causes the combination of carbon with oxygen and hydrogen. Pressure effects the alteration without loss of carbon, while heat wastes it.

### Theories to Account for Difference in Coals

Some of the theories urged by chemists, geologists and paleontologists to account for the difference in coals are:

1. Difference in the kinds of vegetation from which coal is formed. There are many plants from which coal has been formed—trees, ferns, grasses, sedges, mosses, etc. Sometimes one type predominates and sometimes there is no predominating variety. At the present time the mosses predominate in Europe, aquatic plants, especially lilies, in America, and wild rice in Asia. Lignites and bituminous coals are said by some to be derived predominantly from the tissues of vascular plants; that is, plants containing vessels as part of their structure. Bogshead coal, a pure algal coal, was formed largely of gelatinous seaweeds. Paleozoic cannel and splint coals are characterized by great numbers of spores and pollen grains, and very little woody matter. Cannel coal is high in nitrogen, and Newberry pointed out that fish remains are abundant; from which he argues that the beds of cannel coal formed under water and that vegetable matter formed a carbonaceous paste in which the fish remains became embedded and which consolidated to form cannel coal. It has been noted in some of the Scotch peat deposits that the successive layers of peat are made up of the remains of plant life of widely different types, and one of the most striking features is the alternation of forest beds, which are now imperfect lignites, with beds of peat proper. This may account for the several bands of different kinds of coal which make up some of the Illinois coal beds and in other places where this feature is prominent.

2. Climatic differences in the various periods or regions. Naturally, if the type of plant life influenced the resultant coal, it is easily seen how the climatic differences have a part in influencing the type and rate of growth of the plants.

3. The relative length of time since deposition. As the actions involved require the element of time, this may have had something to do with the kinds of coal. Time alone in geology does not mean much, but it must be remembered that the evolution of gases due to heat and pressure require time; also it requires time for the deposition of thick beds of overlying strata.

4. Differences in the kinds, in the limits of activity, and in the products of bacterial action in past ages. Renault believed that the conversion of the dead plants to the compact brown pulp was brought about by bacterial action. Recent authorities believe, however, that the action of micro-organisms is doubtful. They abound in stagnant waters of swamps, and certainly have much to do with the earlier stages of vegetable decay. They start the process, but at the same time they generate antiseptic compounds which limit their activity. Peat, not far below the surface, is distinctly antiseptic and inimical to microbian life. Nevertheless a number of authorities have argued strongly in favor of these organisms as principal agents in the early forming of coal. Their remains have been found in lignite and coal in insignificant abundance and variety.

5. Enrichment by bitumen from other sources, especially from deep-seated rocks. This is one of the earlier beliefs and has little support at the present time, for no avenues through which this material could have come have been found; and a chemical analysis of coal does not support the theory of an addition of bitumen.

6. Great differences in depth of burial beneath other formations. As the pressure and heat are probably proportional in some degree to the depth, it seems entirely plausible that this may have been one of the factors, but by no means the only factor.

7. Changes due to chemical reagents in underground circulation. It is quite possible that this had a considerable bearing on the impurities found in coal. The slow filtration of mineral-laden solutions through the tiny pores of coal may have given rise to the deposition of minute quantities of salts of magnesium, calcium, etc., and the filtration of solutions through cracks and crevices in the coal undoubtedly deposited some of the pyrite of marcasite found in coal as well as the thin plates of calcite and gypsum so often found in the upper layer of the coal beds. It is hard to see, on the other hand, how underground circulation could have had any further action than this except perhaps to work in the opposite direction of dissolving instead of precipitating.

8. Heat effects of intrusive rocks. The result of heat from instrusive rocks can readily be seen in some coal beds where this action has occurred. In places coal grades into graphite or natural coke at the contact of the coal and the intrusive. In a lesser degree this action may have had its results from a greater distance and over large areas.

9. The porosity of the beds overlying the coal. This would allow for the escape of gases to a degree depending on the porosity, therefore to a certain extent it is believed to have some bearing on the subject.

10. Escape of volatile matter through joints in the coal and other rocks. In Rhode Island, where this cracking of the formations is highly developed, we find graphite. In Pennsylvania we find anthracite where there is less cracking than in Rhode Island, and westward we find bituminous where open cracks are practically unknown, although joints are common.

11. The dip of the strata should be taken into account according to some, for an inclined bed would al-

low of a better escape of gases. This point is open to discussion.

12. Differences in time exposed to the kind of decay which takes place in vegetable matter when immersed in water.

13. Crustal Movements—Many persons have appealed to movement in the earth's crust to account for the known variations in coal. M. R. Campbell says that a study of coals does not justify this. Folding of rocks into great synclines and anticlines has changed coal into anthracite in eastern Pennsylvania, but why has not the same movement in some of the isolated synclines of Pocono rocks in Maryland and Virginia produced similar coal? It has not done so; therefore the change to anthracite does not seem to be due alone to earth movement.

14. Spontaneous Combustion—J. F. Hofman has used the analogy offered by the spontaneous combustion of grain, flax and hay, and suggested that something of the same sort may have happened to some of the buried materials from which coal was formed. The idea is rather interesting, but so far as the formation of coal is concerned, the evidence to favor it is incomplete.

The theory of origin of slate, bone, etc., is that occasional currents brought in sediments during the accumulation of vegetable matter, so that the bed was divided into two or more parts. This sediment later became carbonaceous shale, often called "slate" and "bone." When this "slate" bed in the coal is narrow, it is called "parting."

Discussing the theory of natural charcoal, or "mother of coal," some paleo-botanists and chemists hold that "mother of coal" is the remains of cinders, such as the work of forest fires, which were washed into a bog or partially burned on the surface. David White disagrees with this, and believes it is the result of a partial dry rot of woody matter before immersion, or arises from a temporary exposure of the coal-forming accumulation to the air.

The following may be offered in disproof of the cinder theory: (1) Great amount of charcoal often in repeated layers. (2) Large size of some fragments. (3) Mutual relation of some fragments in the same layer. (4) Action of the fundamental jelly on the fragments. (5) Remains of fossils of delicate ferns. (6) "Mother coal" is high in carbon.

Graphite has been formed artificially in various metallurgical operations as a direct product of coal when subjected to great heat. In the retorts of gas furnaces large quantities of graphite are deposited on the inner sides of retorts from the gases driven off from coals. Moissan found that a small crucible of pure coke fitted with a lid was entirely converted into graphite by heating ten minutes in an electric arc. No fusion took place, as the lid of the crucible, which was also converted into graphite, was perfectly free in its place. A similar result was obtained with charcoal from sugar. Moissan also proved that when carbon is vaporized and afterward condensed graphite results.

From the foregoing information two origins of graphite are possible: Volcanic, where the graphite is deposited from volcanic action, as shown by its occurrence in igneous rocks; and vegetable origin, where coal is transformed into graphite by heat and pressure, as shown by the occurrence of graphite in beds that grade into coal.

Some believe that the diamond was formed from carbon which crystallized as the molten magma cooled, while others say that it is by no means unlikely that the diamond owes its origin to a metamorphism of carbonaceous matter by the heat of intruded igneous rocks.

Various attempts have been made to prepare artificial coals in the hope of gaining some information on the genesis of the natural product. Two lines of research have been followed, but no final conclusions have been reached. In the first case pressure alone was tried. It is reported that peat subjected to a pressure of 6000 atmospheres transformed it into a hard, black, brilliant solid which could not be distinguished from coal except by chemical means. Other experimenters found that there was no chemical change due to applying pressure to peat. In the second case heat both with and without pressure was used. Although coal has not been formed, it is possible to trace the breaking down of the original fiber of the peat.

At the present time there is a wide difference of opinion in regard to the manner of the vegetable accumulation and also in the mode of transformation. From the ideas advanced and data collected, it no longer should be held that all coal was formed in the same way. The idea is now being accepted by many that different coal measures may have had different formations, and it is no longer necessary to admit of any one theory to the exclusion of all others. Many theories are accepted for the formation of ore deposits; in the same manner it should be realized that all coal was probably not formed by identical processes.

WEIGHTS OF VARIOUS COALS, AS DETERMINED BY THE BUREAU OF MINES*

| Source of Coal | | | | | Wt. per Cu.Ft. |
|---|---|---|---|---|---|
| State | County | Place | Mine or Name of Coal | Size | Lb. |
| Alabama | Jefferson | Pratt City and Ensley | Tennessee Coal and Iron group | R-o-m | 54.0 |
| Arkansas | Franklin | Denning | Denning No. 2 | Lump | 53.0 |
| Colorado | Las Animas | Aguilar | Royal | Lump | 50.5 |
| Illinois | Williamson | Carterville | Burr C | R-o-m | 55.5 |
| Illinois | La Salle | Cedar Point | No. 5 | 80–15–5a | 46.0 |
| Illinois | Sangamon | Andrew | Cora | 75–10–15a | 48.0 |
| Indiana | Knox | Bicknell | Tecumseh Nos. 1 and 2 | 10–15–75a | 47.5 |
| Iowa | Appanoose | Centerville | Streepy | 60–25–15a | 46.5 |
| Kansas | Leavenworth | Leavenworth | Nos. 1 and 2 | 80–15–5a | 50.0 |
| Kentucky | Webster | Clay | No. 7 | 90–5–5a | 46.5 |
| Montana | Carbon | Bear Creek | Bear Creek | 90–5–5a | 52.0 |
| New Mexico | McKinley | Gibson | Navajo | 80–15–5a | 46.5 |
| Ohio | Jefferson | Piney Fork | Piney Fork | 70–15–15a | 47.5 |
| Oklahoma | Okmulgee | Henryetta | Henryetta | 35–45–20a | 48.5 |
| Pennsylvania | ..... | Delaware, Lackawanna and Western | Anthracite | Egg | 58.0 |
| Pennsylvania | Schuylkill | Philadelphia and Reading | Anthracite | No. 1 Buckwheat | 50. |
| Pennsylvania | ..... | ..... | Anthracite | Egg | 56.5 |
| Pennsylvania | Luzerne | Wilkes-Barre | Anthracite | Egg | 57.5 |
| Pennsylvania | Luzerne | Beaver Brook | Hazleton District anth | Egg | 56.5 |
| Pennsylvania | Cambria | Portage | Plymouth | 20–10–70a | 51.0 |
| Pennsylvania | Clearfield | Curwensville | Caldwell | 0–10–90a | 51.5 |
| Pennsylvania | Jefferson | Reynoldsville | Soldier Run | 65–20–15a | 50.0 |
| | | | Trout Run | | 5 |
| Pennsylvania | Somerset | Somerset | Quemahoning Creek No. 1 | 20–20–60a | 53.0 |
| Tennessee | Campbell | Jellico | Indian Mountain | 80–15–5a | 47.0 |
| Washington | Kittitas | Roslyn | Nos. 1 and 2 | 60–30–10a | 53.5 |
| West Virginia | McDowell | ..... | Pocahontas Nos. 3 and 4 beds | 3–5–92a | 57.5 |
| West Virginia | ..... | ..... | Kanawha Region | 75–15–10a | 55.5 |
| Wyoming | Sweetwater | Rock Springs | Blairtown | 75–15–10a | 50.5 |
| Australia | New South Wales | Abermain | Abermain | R-o-m | 49.5 |
| Canada | British Columbia | Michel | Michel | R-o-m | 55.5 |
| China | Shantung | Tsuchuan | Tsuchuan, Estratum | 15–5–80a | 58.5 |

*Technical Paper No. 184, Bureau of Mines, Washington, D. C.
aPercentages of lump, nut and slack.

# NEWS FROM THE CAPITOL

BY PAUL WOOTON

## Arbitration Board to Look After Interests of Public in Labor Disputes

The Chamber of Commerce of the United States has been requested to form an arbitration board through which differences between capital and labor may be settled and before which the remainder of the public may put forward its views. This is pointed to as one of the evidences that the public, other than the parties to the controversy, is reaching the point where a demand will be made that its interests be taken into consideration during strike periods. It is believed by students of the situation here that it is inevitable that the public eventually will take organized steps to protect its interests during periods of suspended production caused by strikes.

## Car Shortage Inevitable This Fall and Winter Because of Poor Equipment

Traffic officials are unanimous in their belief that a serious car shortage is impending. This is due principally to the need for moving an unusually large wheat crop in one-third the usual time, and to the unprecedented number of bad-order freight cars. With the price of wheat guaranteed by the Government, every effort is being made to market it at the earliest possible moment.

The last two years have seen exceedingly hard service for all kinds of railroad equipment. Before the Government took over the railroads, each line repaired any damage to equipment which took place while on its rails. Under Government control, however, all cars were pooled and no accounts were taken of the line on which the damage occurred. The railroad administration wants the cost of repairing rolling stock charged to deferred maintainance. The individual roads object to this plan. As a result of this controversy, repairs have been held up. There are said to be 150,000 Pennsylvania railroad cars out of service awaiting repairs. The proportion of coal-carrying equipment in bad order is unusually large, since these cars have been subjected to particularly hard usage. The prediction that there is a good chance for the coal situation during the coming winter to approximate that of the winter of 1917-18 is not confined to coal operators.

Reports to the Railroad Administration indicate a very decided increase in the amount of coal loaded in the Pocahontas region, in the amount of coal dumped at tidewater and in the volume of coal handled on the lakes. It is believed that this marks the turning point and that there will be a brisk movement of coal from this time forward. The total dumpings at tidewater in June increased 14,000 cars over June of 1918.

## Fuel Administration Announces That It Has Ceased to Function

The Fuel Administration is calling attention to the fact that it has necessarily ceased to function since June 30 for lack of appropriations, by pinning a slip to correspondence and other documents which are leaving its headquarters couched in the following language:

"The U. S. Fuel Administration, being without funds available for expenses after June thirtieth, has necessarily ceased to function.

"Matters pertaining to accounts can be taken up with the auditor of state and other departments for direct settlement; and legal matters should be taken up with the Department of Justice."

## Miscellaneous Notes

H. N. Taylor, president of the National Coal Association, and J. D. A. Morrow, the vice president, are making a tour of the West and the Southwest, visiting the operators and associations in those sections.

Recent movement of coal through the Panama Canal, as reported by the Panama Canal office in Washington, is as follows: Steamship "Guanacaste," Baltimore to Punta Arenas; steamship "Goodspeed," Baltimore to Callao.

Senator Cummins and the members of the Interstate Commerce Committee have been urged to make provision in turning the railroads back to their owners for the divorcement of the carriers from coal-mining operations. It is understood that Senator Cummins, who is the chairman of the committee, is heartily in favor of such a plan.

Tests of Matanuska coal show that it possesses the necessary steaming qualities for Navy use. This is the opinion of Captain Sumner E. W. Kittelle, chairman of the Naval Commission, who recently visited the Matanuska coal fields. Moreover, Captain Kittelle believes that the Matanuska field can produce adequate quantities of coal for Navy use in the Pacific.

In the matter of advances on coal within the Chicago switching district, the Interstate Commerce Commission has handed down an opinion that the Chicago, Milwaukee & St. Paul R.R. should receive 20 cents per ton as its division of the through rates on coal and coke within the Chicago switching district. Increased divisions were authorized for deliveries at other points within that district. The ruling is to apply from July 1, 1917.

*"Waste neither time nor money," said Benjamin Franklin. Money put in War Savings Stamps is not wasted; it's working for you.*

# COAL AGE

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## High Prices Win

LET not those who, with *Coal Age*, recognized the probability of higher prices, have excessive pride of opinion. The logic of high prices was too clear for any one of judgment to question. It could not fail, with labor determined on shorter hours, more privileges and larger pay, and with capitalists increasing by scores and the sizes of individual fortunes steadily growing larger.

Large price increases are ever to be deplored. A fixity in price would always be far preferable, but the downward price advocated by many as the basis for renewed prosperity could not have done otherwise than wrecked our large national enterprises and caused a great loss to the wage earners of the country as the outcome of slow work.

Falling prices were not, however, misread in the signs though they were by the augurs. The psychology of the masses was all in favor of the prophetic utterances of the seers. There was almost doubt and hesitation enough to wreck the national prosperity, but the facts were lacking, and without a financial basis for disaster doubt and hesitation could not win.

Now, with the psychology turned or turning and the facts unchanged, one may fear that prices will go too high. They may well run fairly beyond control. The world buys either too charily or too lavishly. It is always in torpor or in panic. If we can only speed the buying early, we can so stimulate production that no buying panic will occur. If, however, it is left to the last minute, the market will be stocked and buyers clamorous, and prices will soar to outrageous heights. The parsimony of the buyer always leads eventually to inflated values.

## "Entente Cordiale" in Mining

AN INTERESTING article was presented at a meeting of the West Virginia Coal Mining Institute, in the palmy days of its inception, on "The American Language." In it the writer emphasized the differences in the languages spoken by the American and British people. It is true that the citizens of the United States and Great Britain, especially the technologists, speak tongues alien to one another. Most people would, however, not agree with the author of the paper in his conclusion that the United States should stand by its peculiarities for the sole (and to him satisfactory) reason that they were peculiar and different, and because they emphasized those differences and peculiarities.

The sentiment today, it may be hoped, is changed. In this year 1919, we may be justified in hoping—as we ever were in wishing—that any differences that have crept in may be wiped out and that a common Anglo-Saxon tongue might be spoken by these allied and friendly countries, and that a language combining the good points of both might take the place of two languages each holding hard and fast to its own technical lingo, regardless of quality.

To stop generalizing and get down to the particular: The British miner is quite prone to use the word "thill" to express what we in the United States invariably call the "floor" or "bottom" of the mine. The words we have chosen to use are uttered quite generally in ordinary speech, and when applied to the mine are quite easily understood and their meaning memorized. The word "thill," on the other hand, has in all probability little use in Great Britain except as applied to the material under the coal. It is needless to say that it is not used here either as a technical or a nontechnical word.

It is not a word that is felicitously chosen. Originally it meant a plank, but the plank appeared to narrow up and eventually the word, as far as it came into anything like general use, meant a shaft on a wagon or a cart. Thus shriveled it was quite generally used adjectively in compounds, but it did not have much hold in the language as a substantive. At one time the word may have been locally applied to the planking of a floor; and the suggestion of the mine floor, for a short time, and over a small area of Great Britain, may have been natural and not forced.

But a word like "thill," which only in a certain section and only for a limited time had a small degree of applicability to the mine floor, should not indefinitely, it would seem, be used in that sense. If the word had been naturalized in the United States, it might have been well to have continued its use; as it has not been so naturalized, its discontinuance should certainly be favored.

Lucid writers on coal mines, such as Sir R. A. S. Redmayne in his "Modern Practice of Mining," use indeed simple and expressive words. To Redmayne's great credit much of his writing is intelligible alike to British and American writers. It is to the credit of the mining language of the United States that much of its technology, being couched in the common language, is quite readily understood on the other side of the Atlantic, to judge by its ready use without glossarial comment in the British technical journals.

The British have the unfortunate habit, by no means their own peculiarity, of sticking stolidly to certain words as "a mean thing, but mine own." As lawyers, physicians, electricians and other self-conscious persons hold fast to words and modes of expression solely because they are ancient and mystifying, so too many mining men here and in Great Britain hold with obstinacy to certain words of their craft or of their own coining, which are not nearly as plain as other words that might be used, and which they well know could be used, in their stead.

It is time for the mining men on both sides of the water to go through their prodigious glossaries and rid them of their redundancies, or at least go over them for the purpose of indicating preferences and marking mere localisms, so that writers on technical subjects may avoid the less favored words except on such occasions as demand the use, for purposes of good writing, of secondary words expressive of the same idea.

Sometimes it would be well to enrich the language of American mining with British words. The miners of the United States always term the pillar left to protect

the heading a "stump." Perhaps the British would call it a "stork." Of that many Americans are not clear, though a reference of Mr. Redmayne would seem to suggest that the word "stork" is used to express such a heading pillar.

It might, conceivably, be well to call a pillar heading created in the formation of a "double room," driven with two roads from the entry, a "stork." We might also retain the word "stump" for such pillars as are left when the room pillar is drawn back its required distance, for surely what remains is properly a "stump"; for a "stump" is truly the coal that is left when the main body of the pillar is removed. It is the part left like the "stump" of a tree, a leg, an arm, a tooth or a cigar. The "stork" (or should it rather be "stalk"?) a mysterious but perhaps an expressive word in some local dialect, would then describe a small pillar left, in the driving of a room, to protect the entry. The word "stump" would mean the small pillar left in the completion of the work of pillar drawing, to fill the same essential function.

As we strive as one nation to promote the common ends of our civilization, let us not be bored and hampered by a needless confusion of tongues.

## Why Not the Union

AMID all the suggestions regarding the possibilities of welfare work, perhaps that made by Josiah Keely at the West Virginia Coal Mining Institute, is the most constructive. Why, said he, should not the union undertake to promote the welfare of the members by institutional welfare work? The union is a confederation of men to promote the interests of the mine workers, yet, though this is true, the union unfortunately does not have welfare work among its recorded instrumentalities. Thus, the principle and object "of the Union in District No. 2 (Central Pennsylvania)" is to unite all mine employees . . . to ameliorate their condition by using all lawful means to bring about a better understanding between employer and employee, to increase the wage and improve the conditions of employment of our members by legislation, conciliation, joint agreements or strikes.

A cold nonmoral statement is this, like the articles of incorporation of our business concerns. There is no soul in either, but much soul in those whom the instrument incorporates. Mark it well, the soul that the instrument excludes will find its way despite all forbidding. Already the coal companies have their welfare work proceeding industriously, and the union is beginning to take quite an interest in the safety, education and medical care of its members.

There never was a pure commercial organization so soulless and soulproof that it could keep out the moral consciousness of the men who compose it. The union will eventually do its welfare work. It is sometimes unduly jealous of the work being done by the corporations, but it will have no fear of its own. A clipping informs us that at Hanna City, Ill., the union has started a first-aid school and enrolled 52 men. Other similar schools are to be started. The Iowa and Illinois Bureau of Mines and the mine inspection service is back of the development. It may be added that this is by no means the first time that the union has aggressively backed the mine-rescue work of its members.

One great moral need of men everywhere—the practice of temperance—is now about to be supplied. The temptations toward inebriety will shortly be things of the past. The unions did not have the honor of doing anything toward this great revolution, with its bearings on poverty and accident, though the opportunities must have repeatedly forced themselves upon the attention of the union leaders. Charles Steizle, a man with a disposition very favorable to the working man, is quoted as saying in effect that, "as a result of a study of more than 1000 working men in several different cities I find that of their spare cash—money not spent for the necessities of life—they paid 34 per cent. for beer, wine and whisky.

There is room for an organized welfare movement in the ranks of the working people and we look forward to the day when the union will tackle it.

## The Insatiable Coal Baron Again

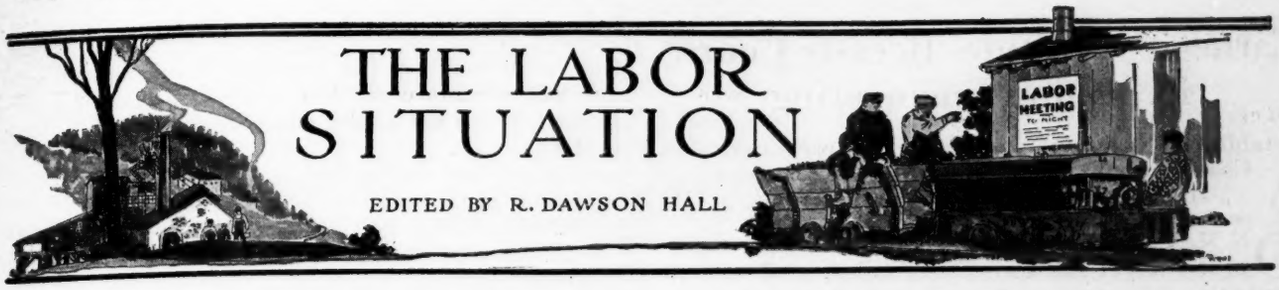
A CERTAIN metropolitan daily evidently believes that coal and all they that produce it are black—at least inside if not out. In a recent editorial it stated that so long as the United States possessed over half the known coal reserves of the world, there is no logical reason why this country should not have all the coal needed and to spare. Readers are told that there is no reason whatever for any prospective coal famine except the rapacity of the "coal barons." It states that mines were shut down "for weeks at a time" this spring, although the needs of the country could have been foreseen quite as readily this year as in previous seasons.

This daily contends that there is no exodus of mine workers in progress from the mining regions and that returned soldiers are deliberately refused employment through the "cussedness" of the operators. Shortage of labor and transportation, it asserts, "can always be played up to ten times their actual significance."

It should be remarked in passing that this is the same daily that a few months ago could not understand why the old culm banks of the anthracite region were not loaded out and shipped to market regardless of the ash, draft, transportation and other problems that the attempt at utilization of this low-grade fuel would inevitably involve.

It sometimes seems a pity that would-be reformers confine their efforts to "hot air." It is perhaps significant that the critics and carpers at the nefarious "coal barons" have never made a constructive practical suggestion. If the metropolitan daily referred to can solve some of the real problems of the coal industry —if it can show how the mine operators can safely store and reclaim a few million tons of bituminous coal each year without danger of either spontaneous combustion or bankruptcy or both—it will confer a boon upon both producer and consumer. One such constructive improvement upon existing customs or natural laws would accomplish more toward public weal than all the maligning its editors can pen and publish in unnumbered years of diligent effort.

*A saving people make a safe government, for the habit of thrift is a shield against the insidious gospel preached by those who would spread discord and disrupt existing institutions. If a man has saved a little money nobody can bully him. The habit of saving is a good one to cultivate.*




# THE LABOR SITUATION

EDITED BY R. DAWSON HALL

## General Labor Review

Members of the Anthracite Conciliation Board took prompt and effective measures on July 1 to adjust the difficulties between the employees of the West End Coal Co. at Mocanaqua and the company officials which resulted in a tie-up at the colliery for more than a month, the men demanding the removal of a mine foreman. The Conciliation Board adopted a resolution directing the men to return to work and, after adjournment, went to Mocanaqua, where they addressed a meeting of the workmen and explained the points at issue. The men on July 2 voted to return to work at once.

Several weeks ago the board members had drawn up a paper summoning the committee of the striking miners to come to the meeting, but the message failed to reach the strikers and their committee did not appear. Rather than wait for another call to go out, the board members adopted the resolution and then went to the mine and gathered the men together.

The men at this colliery went on strike contending that one of the mine foremen had failed to give them full yardage and had cut down their earnings. Mr. Mitchell, the foreman, offered to resign if the men would file one specific charge against him and would prove it. The men have not been able to do this as yet.

Apropos of the meeting on July 1 to inquire into the West End trouble is the statement of several union men of District No. 1 that the Conciliation Board has been tardy in handing down opinions and adjusting difficulties. The statement has been made by a number of union men interested in controversies that have been placed before the board that the present agreement, good until next April, will have expired before decisions are given in some cases unless members of the board speed up their work.

Because a number of their companions failed to produce their union buttons all the breaker boys employed at the Lehigh Coal and Navigation Co.'s Number 10 colliery went on strike on July 8, throwing 700 employees idle and tying up the plant.

A strike at the mines of the Buckhannon Coal and Coke Co. at Adrian, Upshur County, West Virginia, on the Coal & Coke Ry., lasted from Saturday, June 28, until the middle of the first week of July, the miners only returning to work then, pending a conference set for July 15. The strike involved 450 miners, members of Local No. 4443. The grievance of the men was that they were being paid for loading, not on a tonnage basis, as their agreement provided, according to their claim, but on a car basis. This the miners contended involved a failure to recognize their union. The plant of the Buckhannon River company is one of the larger operations in the Buckhannon field, the mine loading about 20 railroad cars a day. It is believed the matter will be amicably adjusted.

Striking miners caused a suspension of operations at the mines of the Loup Creek Colliery Co., at Page, W. Va., on July 1, for a period of two days. The trouble was the outcome of a grievance of the company's motormen who demurred at having to work 15 min. overtime each day in taking men into the mines at four o'clock. The strike declared was for the purpose of forcing action on the demands of the motormen for compensation for the extra 15 minutes.

A statement made by Laurence Dwyer a few days ago indicates that United Mine Worker officials in District 29 are determined if possible to force a closed shop in the New River and Winding Gulf regions. Dwyer in his statement said: "As the Charleston papers stated relative to the adjournment of the conference of the miners and operators that it was adjourned at the request of the miners, and that we would reconvene the conference to complete the contract at a future date, I wish to say that the conference, after holding sessions in Charleston and Atlantic City, adjourned sine die. The reason we couldn't agree was because we will not be a party to an open shop contract, and as that was all the operators would offer us we decided to continue under the present wage agreement until it expires, when we will make a new contract which will be one that does not compel us to work with non-union men."

Officials of District 17, United Mine Workers, have signified their intention of making an active campaign after July 15 to induce operators in certain parts of northern West Virginia to enter into contracts with miners. The drive will be made by officials in the Tygarts Valley, Scotts Run, M. & K., Elkins and Kingwood fields where, although most of the miners are organized, no contracts have ever been signed up. A period of 18 days will be devoted by mine workers' officials to the campaign for the thorough organization of all northern West Virginia fields.

Three mines at Willow Grove, Ohio, operated by the Pursglove-Maher Coal Co., are idle as a result of 800 men striking because of the importation of negro miners. A walkout took place when 20 negroes arrived from the South. They belonged to the union, but nevertheless the men went out.

### Indiana Miners Want New Wage Contract

Leaders of the miners' union in southern Indiana are working on a new wage agreement for presentation to mine operators in the near future. The present wage agreement expired with the signing of the peace treaty. While the operators have been content to permit the wartime program to continue temporarily, the miners insist on a six-hour day and an increase in wages. Operators protest this, however.

Difficulties have been adjusted at the Mission Field Mine No. 6 after a shutdown of several weeks. The men have been ordered to return to work. The mine has been cleaned up and placed in good shape for resumed operation. The miners' train from Danville to Hillery is now running.

An exodus, growing in volume, of foreigners from the Illinois coal fields, is giving increasing concern to the operators, who foresee labor scarcity when the approach of winter brings an increase in the demand for coal. Steamship agents in St. Louis say that hundreds are leaving the country adjacent to that city every week for the eastern seaports. Most of these, outside of the city, are miners. By far the larger proportion of the mining in the Belleville and the southern Illinois fields is done by foreigners. These men, unlike the natives, are thrifty and when miners were receiving unprecedented wages during the war they saved their money and were able to pay their passage back to Europe and have a goodly sum left.

The only thing that sets a limit on the rate of egress is the difficulty of obtaining passage. It is reported that 600 foreigners are waiting at Staunton, Ill., for an opportunity to get started on the journey back to their home lands. In many places coal operators report that forces of 300 and 400 men and upward have dwindled 50 per cent. Without an adequate number of foreigners, there will be a lack of man power when the mines get going at normal rate again, and production will be correspondingly affected.

# Carnegie Institute Recasts Course in Mining Engineering

**Establishes New Four-Year and Two-Year Courses in Coal Mining—Will Promote Greater Efficiency by Co-operation with Mining Interests**

ON MAY 27, 1919, twenty-five of the leading representatives of the coal-mining industry of western Pennsylvania met in conference with President A. A. Hamerschlag, of the Carnegie Institute of Technology, with a view to bringing about closer relations between the Institute and the mining interests. It was felt that the advice of the men in the field was necessary in the proper training of young men for mining work. A resolution was adopted at this conference which, among other things, called for a board of mine operators and engineers to serve in an advisory capacity with the Carnegie Institute of Technology. As a result of the counsel and recommendations of this Advisory Board, the Carnegie Institute of Technology, in coöperation with the U. S. Bureau of Mines, has recast its four-year course in mining engineering and has also established a two-year course in coal mining. To carry out this new program, there has been organized the "Coöperative Department of Mining Engineering" in the Division of Science and Engineering of the Carnegie Institute of Technology.

A large percentage of young men who are brought up in mining communities do not follow the line of work of their fathers. The question of keeping up the supply of trained men for the mines is therefore a difficult one. Few college men are attracted to the coal industry or realize that the possibilities of making a good income from coal mining and the coal business are probably greater than in any other branch of the industries. The desire of the Coöperative Department of Mining Engineering is to counteract these tendencies and to interest young men in the coal-mining industry.

### Requirements for Admission

The four-year course is open to boys with a high-school education or its equivalent. Special endeavor will be made to attract boys who have been brought up in mining communities—sons of mine officials or mine workers. The course furnishes a fundamental training for the mining engineering profession.

The two-year course, planned for the man in the mine, is open to men who have had a common school education and two years of experience in or about mines, or in their management. The two-year course includes not only the fundamental and elementary subjects of engineering, but also their practical application in shops, laboratories and field work. The object is to give to worthy men, who have been compelled to enter the mines to earn a livelihood at an early age and who have made good as coal miners, an opportunity to prepare themselves to follow coal mining on a new and higher basis.

Both courses will begin Oct. 1, 1919. Nine months of college work and three months of practical work in or about mines will be required each year.

General inspection trips will be made monthly by students in both courses to different mines in the Pittsburgh district, as well as to the Experimental Mine, for the purpose of demonstration work. Lectures will be given by operators and engineers in the field, and by members of the staff of the U. S. Bureau of Mines. Mine rescue teams will be organized from the men who have had mining experience to act, in case of emergency, as a reserve to the rescue teams of the Bureau of Mines.

### The Faculty

Professor Fred Crabtree, who is in charge of the Department, is a consulting metallurgist with the U. S. Bureau of Mines.

Captain Edward Steidle has been engaged to take charge of the Coöperative Department of Mining Engineering. He is peculiarly fitted for this position. He has been a mining engineer with the U. S. Bureau of Mines, and has worked in various mining districts in North America. During 1913-14, he was engineer in charge of the Mine Rescue Car No. 6, Pittsburgh-West Virginia district. He retains the status of consulting mining engineer with the Bureau of Mines.

Edward Zern, editor of *Mining Catalog and Coal Catalog*, and president of the Coal Mining Institute of America, will give a series of lectures on coal-mining methods and engineering. Mr. Zern was previously in the employment of the H. C. Frick Coke Co., the Jamison Coal and Coke Co., the West Kentucky Coal Co., as engineer and superintendent, and was professor of mining engineering at the University of West Virginia.

E. G. Hill, instructor of mining engineering, will give attention to metal mining methods and engineering, and the mechanical preparation of ore and coal.

Dr. C. R. Fettke is assistant professor of geology and mineralogy and will have supervision of the work in this department.

### Expenses

The approximate total cost, including board and lodging, of pursuing the courses in mining engineering and coal mining during the nine months of the college year is $50 per month. Any man who is interested and eligible for either course is invited to communicate with the Registrar, Carnegie Institute of Technology, Pittsburgh, Penn. A personal interview is required of all students, both of the four-year and of the two-year courses. A certain amount of financial assistance will be made available by the mining industry for men who take the two-year course. About fifteen men will be accepted each year in the four-year course and twenty men in the two-year course. Classes will be limited in size, in order to insure close relations between faculty and students and the best results from inspection trips.

### Advisory Board

The Advisory Board will advise on all matters pertaining to the Coöperative Department of Mining Engineering. Its advice will aid in giving to the courses of instruction the practical and business features which are necessary to develop the type of mining men especially demanded at this time in the coal industry.

The members of the Advisory Board are as follows: W. A. Luce, general manager (chairman), Ellsworth Collieries Co.; W. L. Affelder, general superintendent, Hecla Coal and Coke Co.; J. M. Armstrong, general manager, Pittsburgh Coal Co.; W. R. Calverley, general manager, Union Collieries Co.; C. E. Cowan, chief engineer, Jamison Coal and Coke Co.; W. H. Glasgow, assistant general superintendent, Frick Coal and Coke Co.; E. A. Holbrook, mining engineer, U. S. Bureau

of Mines; Phillip Murray, district president, United Mine Workers of America; John I. Pratt, mine inspector, Department of Mines, State of Pennsylvania; Capt. Edward Steidle, mining engineer (secretary), Carnegie Institute of Technology.

The Carnegie Institute of Technology and the Experimental Station of the Federal Bureau of Mines are in close proximity, and the students in the Coöperative Department of Mining Engineering will have the advantages of the Bureau's laboratories and equipment and library, as well as the advice and instruction of its technical staff.

The object of the coöperation of the Carnegie Institute of Technology, the mining industry, and the U. S. Bureau of Mines, is to bring about better mining conditions and greater efficiency in mining operations. Decreasing coal deposits and increasing costs of production make it urgently necessary for the coal operators to take advantage of everything which modern science, machinery and methods can contribute. The interests concerned believe that one of the best ways to provide for the future is to offer to selected groups of promising young men in the Pittsburgh district, who may have had a certain amount of mining experience, an opportunity to fit themselves to study the broader phases of coal mining. At the recent meeting of mine operators and engineers mentioned above, the following action was taken: "Resolved, that this group give its approval and moral and material support to the form of education proposed for the Carnegie Institute of Technology, by which students may receive a combined technical, practical and business training necessary to fit them for service in the coal-mining and allied industries."

President Hamerschlag says: "We are located in the very center of the greatest bituminous coal-mining district in the world. This new project, with all interests concerned behind it—labor, capital, the government, and a teaching staff of engineering experts, should do much in the course of a very few years in producing improvements in coal mining that should bring great returns both in harmonious and successful mining operations and in the satisfaction which all the interest involved will have in working out together the necessary solutions of their common problems."

## American Institute of Mining and Metallurgical Engineers

From a technical point of view, the Chicago meeting of the Institute, Sept. 22 to 26 inclusive, promises to be one of the most interesting in its history. The wealth of material in the shape of technical papers for discussion is greater than has been offered for any previous meeting; upward of 150 papers have been submitted to the committee, who found it no small task to arrange a program to present this number with a minimum of conflicts among papers on allied subjects.

One of the excursions to be made by the Institute as a body during this meeting is to the LaSalle district. A special train leaving Chicago early Thursday morning will take the members and guests to LaSalle, Ill., where automobiles will convey the different parties to the coal mines, cement works and zinc smelters. For the ladies and others of the party not particularly interested in these industrial operations, the LaSalle hosts plan an automobile trip to Starved Rock.

## Reinforced Concrete in and About the Coal Mines of Great Britain

By M. Meredith
Liverpool, England

Use of reinforced concrete as a building material has made rapid strides in Great Britain since its introduction about 25 years ago. It is now recognized as one of the standard and best materials for various classes of construction. The Government departments have adopted it for important works and encouraged others to use it, especially during the war, when the shortage of steel was felt.

Plant at coal shafts can be economically and satisfactorily constructed by this method. The advantages over timber construction are seen in its fireproof qualities. In fact, the Board of Trade of Great Britain does not permit timber construction at new shafts at the present time.

With steel work, the constant painting and scraping is an important item on structures of large size; this has been entirely dispensed with by the employment of reinforced concrete. Concrete should be constructed more economically than structural steel; concrete construction is heavier and therefore steadier than buildings of steel or timber. This, under certain circumstances, is an important consideration.

Reinforced-concrete mine props have been used as supports on main entries of colliery workings for some time, and they have proved to be so satisfactory that it is doubtful whether the operators would return to the use of timber, even if it should become cheaper. Reinforced concrete cannot be recommended for use at the coal face because in that case it is desirable at times to change the length of props, and it is not practicable to do this with concrete. On the main entries concrete props are ideal; a great advantage being their long life.

The aim has been to make the concrete prop the same strength, or as near as possible, as the timber prop required for the place in question. It was found by test that in the case of a 5-in. timber prop the breaking load was in the neighborhood of 25 tons. A $4\frac{1}{2}$-in. concrete prop reinforced by $4\frac{3}{8}$-in. bars and hoops had a breaking load in the neighborhood of 25 tons. The coal miners are beginning to appreciate the advantage of these props, which can be so designed that the top is the weakest portion; when they give way the prop can be taken out, the concrete chipped away, the reinforcing iron can be sawn off and the prop (although reduced in size), can be used again. One prop was used three times over in this way. When it was first tested it carried 25 tons or thereabouts. The top was cut off, and the second time the prop carried a little more. The third time it carried 25 tons or thereabouts. Sometimes a squeeze came on, and whatever was put in could not resist that weight—something must give way. In that case the top of the prop would go and the prop would then be taken out and used somewhere else, after the top had been cut off.

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THE FOLLOWING CONCISE and pithy expressions appeared in *Power* recently and are well worth being passed along: Adaptability means doing the next best thing in the handiest way. Efficiency is knowing just how and fitting it to just when. Loyalty consists in being decently considerate of the boss. Responsibility lies in having grit enough to risk a call down. Opportunity is the same thing as being born lucky. Reliability shows the capacity for staying put longest. Integrity is the Sunday name for plain weekday honesty.

# He Who Rides with a Powder Keg Joy-Rides with Death

**Many cars are, to all intents and purposes, powder magazines on wheels; in these cars are men with open torches, and the risk is always present that at any time the powder will become ignited and kill every man on the trip. Can you take that chance?**

# DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

## Living Conditions at Mines

*Letter No. 6*—I have followed with deep interest the letters published in *Coal Age* regarding the improvement of living conditions in our mines, and beg to state that this is a very important subject and one that needs prompt attention and concerted action on the part of coal operators in this country.

Particularly is this true in these days of reconstruction when the atmosphere is diluted with dangerous propaganda and Bolshevism is crying in a false tone for better living conditions that they are determined to gain by force. The poor and ignorant classes influenced by this propaganda do not realize that the carrying out of their program would only mean hardship and suffering to themselves.

The successful promotion of better living conditions in our industrial centers requires the coöperation and support of every American, in this enterprise. A country-wide campaign should be undertaken, advertising in the daily papers that better living conditions can only come through the friendly coöperation of better citizens, who, by kindness, will be able to overcome those of their fellow workers who are bent on tying up industrial enterprises, which can only make life miserable for the workers.

The Census Bureau statistics recently published show that there are over 14,000,000 foreign-born residents in America, less than 10 per cent. of whom are naturalized American citizens, who make up the thrifty class of our foreign-born workers.

### Exodus of Foreign-Born Mine Workers

It is rumored that millions of our foreign population are preparing to return to Europe, as a result of the well-organized propaganda now being circulated throughout the country. The keynote of this propaganda is "Cash in your Liberty bonds; bring your bank accounts to us and come back to your own country where you will be enabled to enjoy the freedom and unrestricted personal liberty for which you have long been striving."

One cannot help but wonder whether the broad-minded American employers are going to stand idly by and allow this propaganda to result in a calamitous withdrawal of bank and savings accounts and a shortage of labor that must bring about increase of wages, strikes and industrial unrest, with all the attendant evils that prevail in Europe today.

The question will be asked, "What can be done to prevent this condition in our own country?" The answer is, Make life worth while for the working classes, by giving them the pleasures to which they are entitled and improving their home life and health to an extent that they must recognize that the treatment they receive in America is better than what they could hope to gain elsewhere.

No one doubts that, today, we are entering upon the most important period affecting the future of this and other countries. It is a time when regard for one another's welfare must take the place of that selfish ambition developed by the "get-rich-quick" idea, by imposing on our workers conditions they cannot endure.

In closing, let me say that employers here in our country should be proud to prove to the world that they consider the profits of their industries of less importance than the welfare of their workers. The question is, however, how can this idea be impressed on the minds of workmen, that the interests of each one are bound up in the interests of all.

Success means coöperation in establishing a community of interest, to the end that employers and workers in every industry shall strive for the common good. Let me add that not until capital and labor stand, foot-and-foot, on the same elevation, in respect to life's privileges, will the working classes recognize and enjoy the ideals for which America stands—Freedom, Justice and Equality.

Joseph R. Thomas.

Plymouth, Penn.

## Robbing Pillars, Anthracite Mines

*Letter No. 2*—I was deeply interested in the letter regarding the robbing of pillars in anthracite mines, by Joseph R. Thomas, *Coal Age*, May 22, p. 938. The work of robbing pillars is always dangerous and requires much skill and good judgment. Especially in the anthracite region where conditions are so variable, no special rules can be given to guide those engaged in the work. Practically, the only general rule to be followed is that, in order to secure a fair percentage of recovery under these varying conditions, rapid and well directed effort is necessary.

As Mr. Thomas has remarked, the cost of timber required for this work is high, and it is true that much timber is being wasted where a considerable amount of robbing is being done. When the pillars are small, more timber is required than where ample pillar support has been left in the first workings. However, it is too late now to overcome this difficulty. The problem that confronts us is how to recover as much of these small pillars as possible with the least expense and the greatest amount of safety to the men.

One of the chief factors in the work of robbing is the character of the roof strata directly above the coal. A strong sandstone roof requires little timber. Indeed, timber supports are of no avail to resist the roof pressure in this case; but posts are stood merely to serve as a warning of impending danger. Under a strong roof, it is important to make every effort to induce a fall back in the waste, as a large standing area greatly increases the weight resting on the pillars and makes the work of robbing more difficult and dangerous.

With a weak roof under a considerable cover, more timber is required for the protection of the men. Strange as it may seem more accidents occur when working under a good roof than where the character of the roof requires the miner to be always alert to the danger that surrounds him. The work of extracting pillars is much more hazardous in anthracite than in bituminous mining. In the anthracite region, the coal measures are much disturbed and the coal must be mined often on heavy pitches where the falling roof slides down the pitch and endangers the miner.

Much extra work is required on steep pitches to avoid loose material falling into and choking the chutes and manways, which would then have to be cleared or a passage opened to take the coal to the gangway below. Much extra labor is also necessary in order to get the timber up these steep pitches, especially in a thick seam where the length of the props required may vary from 10 to 16 ft. It is nothing unusual to find one or more of these props discharged by a blast and carried some distance down the chute, from which they must be recovered, taken up the pitch and again set in place to support the roof.

### Factors That Determine the Direction, Size and Strength of Pillars

Another important factor and one that controls both the laying out of the chambers and the robbing of the pillars is the pitch or inclination of the seam. Naturally, owing to the difficulty of handling water and coal on the dip, the chamber must be driven either on the strike of the seam or to the rise, the former being generally preferred. However, pillars running with the dip present the maximum resistance, and there is not the tendency to overturn as when the pillars run parallel with the strike of the seam. For this reason a greater width of pillar is required where the chambers are driven on the strike.

The strength of pillars varies inversely as the thickness of the seam and directly as the cosine of the angle of inclination. A greater width of pillar is therefore required in mining thick seams on steep pitches than is required in working thinner coal having a less inclination. The character of the coal is also an important factor, a greater width of pillar being required where the coal is soft and friable than where it is hard and tenacious. As a general rule, also, the roof pressure is greater in the basin than in other portions of the mine, and a greater width of pillar is required as the workings advance to the dip.

In anthracite workings, it is seldom that the dip of a seam remains constant; changes are frequent and these will require, at times, some change in the development of the work. Such changes are apt to lead to much confusion and require a careful study to determine the effect produced in the roof pressure.

### Importance of Drawing All Post Timber

Regarding the question of drawing timber, asked by Mr. Thomas, let me say that the Pennsylvania Coal Co., operating in this locality, has followed the invariable practice of drawing all standing props as quickly as the pillars are removed. This work is performed by special prop pullers and much timber is thus saved. The Cooper vein will average about 12 ft. in thickness. The props seldom split through the center, but bend or break off about 3 or 4 ft. from the floor. These broken timbers are taken out and sawed off for use in the smaller veins. It is evident that the use of prop pullers effects a much needed saving, as timber is becoming more and more scarce each year.

While the use of steel and cement supports has been a saving, it does not seem that this has greatly decreased the consumption of mine timber, which appears to be steadily on the increase. The tendency of most miners, today, is to set too little rather than to use too many props, but the one thing that needs careful watching is to see that miners do not allow props to become buried and lost in the waste. Some willful miners allow good props to be covered up rather than make any effort to recover such timbers. The entire work of drawing back pillars and recovering timbers should be in charge of experienced and competent men capable of exercising the best skill and judgment and detecting the presence of danger where the casual observer would not be conscious that such danger existed. Richard Bowen.

West Pittston, Penn.

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## Cost Reduced in Machine Mining

*Letter No. 3*—Kindly permit me to offer a few words in reply to Thomas Hogarth, whose letter appears in *Coal Age*, May 8, p. 887, commenting on my previous claims of the work that *can* be and *is* accomplished in our mines, in cutting coal with the Sullivan machines. From Mr. Hogarth's remarks I can see plainly that he is a Goodman-machine man.

First, in regard to my statement that our cutters left 4½ or 5 in. of bottom coal, let me say that this was according to my instructions to the machinemen. I do not consider that the coal they left represented a loss. There was a reason for doing this that I do not care to explain further than to say that conditions often oblige a mine foreman to make some slight concessions to his men, in order to avoid extra expense. If my friend is a mining man of experience, he will understand my meaning, as he has probably been in positions before this that required him to study out a plan to extricate himself from a difficult position. In order to get the best results from machine mining, a mine foreman must be on the move and study carefully the work done in the mine, in all its details.

### Foremen Can Expedite Work of Coal Cutters

Now, regarding the amount that I stated my cutters can advance, let me say that this very largely depends on what the boss accomplishes in getting the places ready and in condition to cut, so that the machinemen are not delayed in their work. At times, it is necessary to change the angle of driving the places so as to overcome water conditions. Everything depends on adopting a good system and seeing that the men live up to it and in making it plain to them that you are the boss.

Another point Mr. Hogarth mentions is the kind of bits used in our machines. Regarding them, let me state that this is another point that I do not care to discuss more than to say that these bits represent some hard study, which has enabled me to overcome certain difficulties in the cutting of coal.

In regard to caring for the machines, let me say that a machineman who is not capable of keeping up his own machine is not competent to run a machine. Fur-

ther, if there is any doubt in Mr. Hogarth's mind regarding my statements, I will bring cutters and come myself and prove the truth of my claims. In closing, let me add that I can have the coal cut on the slate bottom, or leave any thickness of bottom coal that I choose. I have observed in some mines that the cutters are boss, and not the foreman, which will explain the results accomplished. JOHN H. WILEY.

Oliphant, Penn.

# A.C. vs. D.C. Current in Mines

*Letter No. 3*—At the Pittsburgh meeting of the Coal Mining Institute of America, last December, there was a discussion of the question, "Is the underground use of alternating current more hazardous than the use of direct current?" Since then several writers have discussed the matter in *Coal Age*, and expressed their views regarding the relative hazard of these two types of current. While many points are involved in an answer to this question I will attempt to cover the most important ones pertaining to life and fire hazard in mines.

As direct current is more generally used than alternating current, in coal-mining operations, it is better understood by mining men, both in respect to its applications and hazard. The general impression is that alternating current is more dangerous than direct current. Is this a fact and, if so, what is the reason? Can it not be made just as safe as direct current; or is there something about alternating current that makes it inherently more dangerous? These are a few of the questions that naturally arise and require an answer before a decision can be reached as to which of the two types should be installed, in a mine, in respect to the hazard, or other considerations of cost, upkeep, application and suitability. The items last mentioned are apt to occur in such a variety of combinations and of varying degrees of importance that any given case must be made a study by itself.

## Relative Danger Carefully Analyzed

The danger involved in the use of either d.c. or a.c. current is the chance of shock, by men and animals coming in contact with live wires or equipment. The hazard of accidental contact can, of course, be reduced by protecting all wires and equipment; but in coal mining it is next to impossible to maintain ideal conditions even with a thorough system of inspection and maintenance. This applies not only to electrical equipment but to mining conditions in general. The question then resolves itself into asking which form of electricity is the more dangerous, assuming that the same attention is paid to installation and upkeep.

The impression that a.c. current is the more dangerous type is probably due to the generally higher voltages than in the use of d.c. current underground. In the early days of mine electrification, it was natural to adopt the 500 or 600 volts used in railway practice and because this high voltage reduced the initial cost of installation and the line drop in the transmission of power.

In those days, the question of life hazard was not urged as forcibly then as now, and the danger from a live trolley wire 15 or 20 ft. over the track was nothing in comparison to what it is when that trolley is brought down within striking distance of a man's head. Moreover, the damp and wet underground conditions increased the danger of using a high voltage. Fortunately, however, the danger was quickly realized and at the present time 250-volt direct current is used for haulage, and in many instances for power in mines. This voltage is now considered as the standard for underground work.

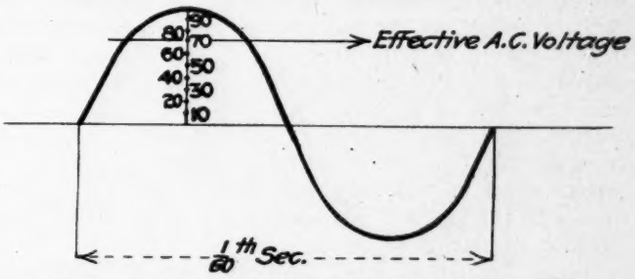
However, in the later development of mines, difficulty arose in transmitting the necessary electric power long distances to the working face, owing to the increased line drop and consequent loss of power. For this reason, it was necessary to employ a.c. current and, today, many new mines are thus equipped in the start, in order to forestall such difficulties arising later in their development. Another important reason for the general adoption of a.c. current is that many mines are now purchasing power from central stations, or are producing it at other distant mines and using it as such or converting it, in part or entirely, to d.c. current, at convenient points.

## Increasing Use of Alternating Current in Mines

To those who have studied the trend, it is apparent that a.c. current is here to stay, and is being more generally used for mine electrification the better it is understood. The question of safety that arises in every contemplated installation is, How does a.c. differ from d.c. current, and does it involve a greater hazard when used in mines?

As far as the hazard is concerned, the difference lies in what the workman thinks is the relative danger and what that danger actually is; or what is the relative effect on the human body or an animal when coming in contact with a live wire.

The average mine worker, thinking that one current is more dangerous than another, will take risks with the




VOLTAGE CURVE, SINGLE-PHASE, A.C. CURRENT

one he thinks is less dangerous. He knows nothing of the nature of the current, its voltage, frequency, etc., and, in all probability, will expose himself to a sadder experience with the kinds of current that he knows less about. But, as unfortunate as such an attitude in an employee may be, we will pass this by and discuss tne matter on a purely scientific basis regarding the physiological action of both kinds of current.

The nerves of the body are analogous to the wires over which electric current is sent and, strange to say, there is a close resemblance between the *mental stimulus* putting a muscle into action through the nerve force and an *electric shock* producing a similar action, by coming in contact with a live wire. The effect produced depends on: (1) The kind of current; (2) the voltage; (3) the thoroughness of contact.

Now, in respect to kind of current, as its name implies, alternating current is constantly changing. From a maximum in one direction the voltage reduces to zero, then increases to a maximum in the opposite

direction and again reduces to zero, increasing then till it reaches the maximum from which it started. This alternating change in voltage is indicated by the curve shown in the figure just given, which represents a complete cycle. In a 60-cycle system, this is repeated 60 times a second, or 25 times in a 25-cycle system, and produces the continuous stinging sensation experienced when coming in contact with a live wire carrying a.c. current.

On the other hand, d.c. current consists of a steady flow and there is no perceptible sensation after the first contact, notwithstanding the current is flowing through the body. In other words, contact with a live wire carrying d.c. current immediately gives the muscles a twitch, after which there is no discomfort provided the contact is light; but the twitch of the muscles will be repeated on breaking the circuit. In alternating current, the continuous reversal of the a.c. voltage causes stimulation of the muscles of the body as long as contact with the wire is maintained. Generally, there is difficulty in letting go of a wire charged with a.c. current, because of the stimulation of the muscles.

### Harm Done Depends on Energy of Current

For the same power transmitted, the voltage determines the amount of current flowing, assuming an equal degree of contact with the wire. The harm done is usually considered to be represented by the energy, which is the product of the voltage and the current passing. If the voltage is extremely high and the current immeasurably small, as in many of the stage exhibitions of passing "millions of volts" through a human body, no more harm is done than when a larger current passes under a lower voltage.

The amount of current flowing under a given voltage will depend on how good a contact is formed. The surface contact of the human body is rather high and if this should be punctured it will allow considerable current to flow through the body, even though the pressure is as low as 50 volts. Also, much depends on the amount of surface in contact. A man who is very wet from perspiration and standing in water will receive a serious shock on making contact with a 250-volt circuit, even with the inside of his hand, which is considered the thickest insulation of the human body.

Harm that comes from accidental contact with live wires depends also, to a great extent, on the makeup of the individual. It is a peculiar fact that a mule is more sensitive to shock than a human being. It has been frequently observed that it takes less voltage to kill a mule than a man.

The voltage of an a.c. current, as measured by an instrument is not the maximum voltage that occurs at the peak of the cycle just described; but, in case of the sine wave, is about 70 per cent. of that value, as indicated by the horizontal line in the figure. The injury or shock resulting from contact, however, depends on the maximum value of the voltage. Consequently, a 100-volt, d.c. current would be equivalent to about a 70-volt a.c. current; or a 220-volt, a.c. current would be equal to about a 315-volt, d.c. current. This is borne out by my own experience, and one frequently hears it remarked that a.c. current stings more than d.c. current of the same voltage. If the a.c. current voltage gives a sharp saw-tooth wave instead of a sine wave the shock is all the more severe.

The bare trolley wire required in mine haulage is the chief source of danger and must be guarded at all exposed points in the mine. As far as the other wires and equipment are concerned, there is no reason why they should not be installed and maintained so as to prevent any injury from accidental contact and all equipment made safe by grounding. Even then, after every precaution has been taken, many cases of willful contact for play or to win a wager will occur. There are, in this country, however, comparatively few installations of a.c. current for haulage purposes and, neglecting these, it is fair to state that an a.c. installation underground should represent no more hazard to life than d.c. current, even though, as has been stated, for the same voltage, the shock from a.c. current is slightly more severe than that from d.c. current.

So far we have considered the comparative effects of a.c. and d.c. current of the same voltage. It is obviously unfair to the former to compare its behavior at high voltage with that of the latter at low voltage. The high a.c. voltage is necessary to deliver the power to distant points, which could not be reached as economically with d.c. current, unless the latter were of a similarly high voltage. In such an event, there would be just as much harm to life from the high voltage d.c. current as from the a.c. current. In other words, when adopting a voltage above the 600-volt class the danger is, of course, very much greater; but the kind of current makes very little difference in the hazard. Practically all the installations of a.c. current underground are of 1100-volt or higher. It has been found that the best voltage for electrocution is somewhere between 1800 and 2200 volts. It is therefore obvious that the utmost precaution must be taken to install a.c. current of this high voltage properly, in order to reduce the life hazard.

### High-Tension Lines Safe If Properly Insulated

In carrying a.c. current of high voltage into a mine, except when it is taken down a borehole, there is the natural feeling that high-voltage wires of any form whatever are objectionable where they may be exposed on a passage or traveling way. But, cables properly insulated, covered with lead and otherwise protected mechanically, are undoubtedly safe to install anywhere, provided they are properly grounded. Such cables, however, are not foolproof against malicious damage, and it is possible for them to be deliberately damaged and cause shock by contact or by grounding. Men are, as a rule, afraid to tamper with such cables; they have heard how some fellow got it by trying some stunt to put the mine out of business; whereas, he put himself out of business and the mine continued to run.

The fire hazard, as far as arcing from the voltage is concerned, is practically the same whether a.c. or d.c. current is installed. If there is any difference it is in favor of the former, because an a.c. current arc will not sustain itself like a d.c. current arc. The a.c. arc tends to go out when the voltage passes through zero of the cycle. As far as the heating effects are concerned, they are practically the same for both types of current, except that in a.c. current a wire is more apt to be overloaded, especially if the motors are operating at low-power factor and allowance for this has not been made in the installation of the wire.

In dealing with a.c. current of 1100-volt and higher, it is quite usual to find in every installation, oil-immersed transformers installed underground and also oil used for oil switches and starting compensators. It must be admitted that the use of this oil is a fire risk, particularly in the case of transformers. A similar fire

risk is not present in a low-voltage, d.c. current installation, and in this respect the use of a.c. current is slightly more hazardous than d.c. current. However, if it is necessary to install a.c. current, there are well known ways of guarding against this fire hazard, by locating such equipment where fire will do the least harm, and safeguarding it both against fire, and protecting the remainder of the mine, in case of fire, by providing suitable means for confining the fire and extinguishing it should one occur.

H. M. GASSMAN,
Birmingham, Ala. Consulting Power Engineer.

## Firebosses as State Officials

*Letter No. 8*—Since reading the letter of Edward H. Coxe, *Coal Age*, May 8, p. 876, who, as general manager of the Snowdon Coke Co., at Braznell, Tenn., is opposed to the employment of state firebosses, I have been wondering if he recalls, as I do, the terrible explosion that occurred in the Braznell mine, Dec. 23, 1899.

In the Braznell explosion, every man in the mine was killed, nineteen in all, if I remember correctly. It was known that there was a good deal of gas in the mine, but the fireboss did not dare to report it when making out his daily report, fearing that he would be fired. It was a well known fact that the mine foreman would frequently work places containing gas. Other places were left full of gas, until the adjoining rooms could be driven up far enough to put a crosscut through so that the air current would drive off the gas.

The same condition existed in the Grindstone mine, about a mile from the Braznell mine. An explosion had occurred in the former, owing to the same cause, about six months previous to the Braznell explosion (July 24, 1899). I was working in the Grindstone mine at that time, being employed as a machine runner. I also made one of the rescue party, at the Braznell mine, some weeks after the explosion in December.

These occurrences lead me to think that if our firebosses were authorized to act as assistants to the mine inspectors, such conditions would not exist in the mines, and gas would be reported whenever found. A fireboss, then, would not fear the loss of his position by reason of reporting gas. It is natural to understand that a general manager would prefer to employ his own fireboss, so as to control affairs in his mine according to his own will, which a state fireboss would prevent.

Cumberland, B. C., Can. A. TRUBIE.

*Letter No. 9*—Referring to the discussion on this subject, I am convinced that if our firebosses were clothed with the authority of state officials no harm would result as some writers have predicted. Instead, I believe that it would prove a boon to both operators and miners.

Accepting, as we must, that it is the general desire of all operators that their mines shall be kept safe and in the best possible condition, I fail to see that it matters whether a fireboss when making his examination of the mine acts for the company or for the state. Operators have invested thousands of dollars in the development of their mines, and it is only to be expected that they require their superintendents and foremen to abide strictly by the laws of the state.

This being true, the employment of state firebosses would seem to appeal to most operators as a move that would yield better results and prove a big factor for safety. Operators who oppose the plan are largely those who object to receiving orders from their firebosses. They know that if a fireboss was to be clothed with state authority and act as an assistant mine inspector they would be obliged to sit up and listen, or close their mines.

In my opinion, if daily reports were required to be sent to the state officials as well as to the officers of the company there would be a vast improvement in the condition of our mines that would prove a great boost for safety. It would make all mine officials more efficient.

It must be admitted that in a few instances a state fireboss might require the foreman of a mine to perform some unreasonable work; but this possibility could be safeguarded by placing restrictions upon the kind of work that would be under the fireboss' jurisdiction. The argument, however, furnishes no grounds for opposition to the plan. It would be understood that a rigid test would determine the capability of a fireboss acting for the state, and only those showing the highest efficiency would be authorized to act as state examiners of mines. This would insure the employment of capable men, whose word should be law, in respect to safe mining conditions.

### HANDICAP OF STATE MINE INSPECTORS

Admitting that there are deputy mine inspectors who are paid to visit and inspect the mines for safety, is it not true that the territory in charge of each inspector is too large to enable a thorough inspection and insure safety at all times? Is it not true, also, that the term of office of mine inspectors is generally too short to make them thoroughly familiar with conditions in the mines in their charge? This being the case, a mine inspector may be easily misled by the arguments of a mine official who is disposed to take chances, and has no desire to comply with a request of the inspector. This could not happen where the fireboss stationed at that mine acted with the authority of the state.

Although, in my experience of a number of years of firebossing, I have worked under many good and honest mine officials, it has happened, at times, that the situation in a mine had to be dealt with forcibly and caused some unpleasantness before the mine foreman would comply with my orders. Some years ago an incident occurred at the mine of which I now have charge that I will cite as an illustration of the need of a fireboss being given a free hand.

At that time, a flood was raging in the district and the mines were not working. The fireboss was ordered or told to be on hand in the morning when the men went to work and no previous inspection of the workings was made. A few hours later a sledge was needed and one of the daymen was sent down a certain entry to hunt for the tool, with the result that his naked light ignited gas that had accumulated there and an explosion followed killing four men.

This is but one incident of many that cause the high death rate in mines throughout the country. I am confident that if we could hear many weak-kneed firebosses relate the results of mine foremen and superintendents not complying with their orders the narration would startle the public and show the need of greater authority being given the firebosses employed in our mines. J. H. TAYLOR.

Athens, Ind.

# INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

## Fatal Hoisting Accident

Recently a fatal accident occurred, killing one of the employees of a contractor who was engaged in excavating and enlarging a cellar under the house shown in the accompanying photo, Fig. 1. The accident was due to the breaking of a manila rope used to hoist the excavated material up an incline that extended into the cellar. The steel rope shown in the foreground was used after the accident and until the job was finished. The man was killed by the loaded car running wild down the incline when the rope broke.

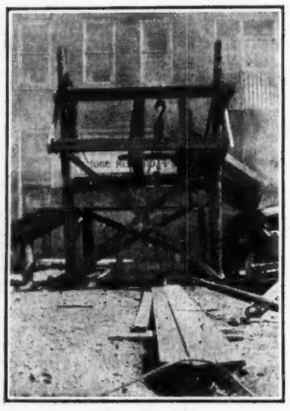


FIG. 1. HEADFRAME TOP OF INCLINE

In order to quickly and conveniently remove the dirt from the cellar, an incline track had been erected, as shown in the diagram, Fig. 2. This incline was about 49 ft. in length. Commencing at the top or outside dump, the incline pitched 6 deg. for the first 6 ft.. then 22½ deg. for 27 ft., and then 10 deg. for the remaining 16 ft., after which the track ran level for 35 ft. About 20 ft. from the end was a shunting track.

Two mine cars were procured for the purpose of conveying the excavated dirt up the incline, and a full-sized, ⅞-in., or more likely 1 1/16-in., rope was used, a team of horses being employed to pull the loaded cars

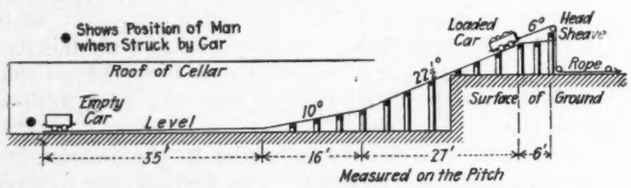



FIG. 2. SHOWING PROFILE OF INCLINE

up the incline. The rope had just been bought for a best quality of manila rope and was new when put on this work. However, in my opinion, the rope was much inferior to the best grade of manila rope.

This new rope was put in and the work started Thursday morning. Some 200 cars had been pulled out of the cellar and when a loaded car was being hauled up, on the following Saturday afternoon, the rope broke about a foot from where it was coupled to the butt-stick of the horse's harness. The gross weight of the load being hauled was 2730 lb., the car weighing 840 lb. and the dirt 1890 lb. There was some dispute among the men regarding the weight of the load, and to ascertain this fact the loaded car was pulled out and weighed, showing its weight to be 2730 pounds.

At the moment when the rope broke the load was on the steepest part of the incline, approaching the knuckle, as shown. At the point where the break occurred, there had been more wear on the rope, for some two feet or more, than on any other part of the rope. I presume this was owing to the rope trailing on the floor when the car was being lowered.

The car had a sidedump and, after being emptied, was lowered by backing up the horses. The descending empty car kept the rope tight, until the car had reached the bottom of the incline. Then the car had to be pushed over the 35 ft. of level track, and the rope would trail on the floor. The extra wear on the rope was plain to be seen at the point where it broke close to the butt-stick, which was heavy and would have a tendency to hold the rope down on the floor.

The rope passed over three pulleys, as shown in the figure, a 9-in. pulley on top of the headframe, angle of deflection 70 deg.; a 9-in. pulley at the foot of the headframe, angle 90 deg.; and under a 5-in. pulley to hold the rope down.

We want to ask, What would be considered a safe working load on this incline, with the pulleys fixed as shown in the figure and using a ⅞-in. rope of this description, assuming the strength of the rope is decreased, say 15 per cent., due to wear? Also, what time would it take for the loaded car to reach the man, counting from the time the rope broke to the moment it crashed into the empty? The incline and track were in excellent condition. MOSES JOHNSON.

Lethridge, Alta., Can.

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The load on the hoisting rope, at the moment of rupture, is the sum of the gravity pull and the track resistance. Calling the angle of inclination $a$, the weight of the loaded car, in pounds, $W$, and assuming a track resistance, in this case, of 30 lb. per ton normal pressure on this incline, which makes the coefficient of track resistance $30/2000 = 0.015$, the load on the rope when the car is approaching the knuckle is

$$L = W(\sin a + 0.015 \cos a)$$

But, $W = 2730$ lb.; $\sin a = \sin 22\frac{1}{2}° = 0.38268$; and $0.015 \cos a = 0.015 \times 0.92388 = 0.01386$; giving for the load that broke the rope

$$L = 2730(0.38268 + 0.01386) = 1082+ lb.$$

The breaking strength of the best grade of manila rope (average of different makers) ⅞ in. in diameter is 6000 lb. The safe working strength of such rope should not exceed 800 or 1000 lb. It seems likely that, if this rope was of "best quality," its fibers had been badly injured and cut by the horses' hoofs and otherwise worn, which caused the break. Nothing but a ⅞-in., 6-strand, 19-wire, crucible cast-steel rope should be used for this work.

Calculation shows that, under fair conditions of car and track, the loaded car would reach the man in exactly 4 sec. after starting from the knuckle.

# EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

## Mine Managers' Examination, Springfield, Ill., April 8, 1919

(*Selected Questions*)

*Ques.*—What is meant by the natural division of the air current in a mine, and what necessity arises for a different division of the air between the several districts of the mine?

*Ans.*—The natural division of the air in a mine is produced when no artificial obstruction is introduced into one or more of the airways traversed by the current. In other words, the air divides naturally between the two or more airways that may be open to its passage through the mine, the larger quantity of air circulating through those airways having the lesser resisting power; or, in other words, the airways having a larger potential, as expressed by the ratio of the sectional area to the square root of the rubbing surface of the airway.

It often happens that airways, or sections of the mine, that are more extended or which have a contracted sectional area require the larger proportion of the air circulating through the mine, owing either to a greater number of men working in the airway or section, or to the generation of gas. In such a case, it is necessary to place an artificial obstruction in the airway or section that would otherwise receive more air than its rightful proportion.

The obstruction placed in an airway increases its resistance and has the same effect as lengthening the airway, or decreasing its sectional area. In other words, it diminishes the potential of that airway or section with the result that the larger proportion of air is made to circulate through the other airway. This arrangement is described as "proportionate division" of the air.

*Ques.*—How is the resistance of a regulator calculated?

*Ans.*—In order to calculate the resistance of a regulator, it is necessary to multiply the unit pressure due to the regulator, by the sectional area of the airway in which it is placed. The pressure due to a regulator is equal to the difference between the natural pressure of the free or open split containing no regulator, and the natural pressure due to the passage of the required volume of air through the regulator, after it has been placed in position in the airway. The difference between these two natural pressures is the unit pressure due to the regulator, and which results in increasing the resistance in the regulator split. The increase in resistance, or the resistance due to the regulator is found by multiplying the difference in pressure just mentioned, by the sectional area of the airway.

*Ques.*—A fan running at 80 r.p.m. delivers 100,000 cu.ft. of air per minute in the mine; how much air will this fan deliver under the same conditions when running at 100 r.p.m.?

*Ans.*—Approximately, under fairly normal conditions in mining practice, the volume of air in circulation varies with the number of revolutions of the fan per minute. On this basis, the speed of the fan being increased from 80 to 100 revolutions a minute, the ratio of increase being $10/8 = 5/4 = 1.25$, the increased circulation will be $1.25 \times 100{,}000 = 125{,}000$ cu.ft. per min.

Owing to the change that takes place in the efficiency of a fan when its speed is much increased, this increase of quantity is not realized, in practice. More accurately, the fourth power of the ratio of increase in speed is equal to the fifth power of the ratio of increase in quantity; and, in this case, we have for the increased quantity when the increased speed ratio is 1.25, $100{,}000 \sqrt[5]{1.25^4} = 119{,}500$ cu.ft. per min.

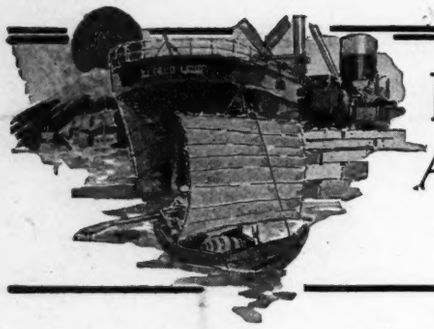
*Ques.*—How would you conduct your examination of a gaseous mine to ascertain its true condition?

*Ans.*—Such an examination must be made with an approved form of safety lamp that has been examined and tested. Before entering the mine observe that the ventilator is running uniformly at its regular speed. Then, proceeding to the foot of the downcast shaft or intake entrance of the mine, follow the air current in its course throughout the mine, examining in order each working place in each separate section of the mine, making a careful test at the face of every working place and observing the condition of each place to detect any danger that may exist, either from the presence of gas or bad roof.

Where gas is found, it should either be removed at once, by erecting the necessary brattice to deflect the air current so as to sweep the place where the gas is lodged; or, if this is not done, all entrances to the place must be safeguarded by a proper danger signal that will warn men not to enter. In this manner, the working faces must be examined, in each of the several sections of the mine, and the quantity of gas circulating in each section noted. Notes must also be made of the condition of each section of the mine, in respect to the presence of danger from bad top. A full report of the examination must be entered in a book kept for that purpose, immediately after the examination is finished.

*Ques.*—What load will a round iron bar one-inch in diameter carry, the tensile strength of the iron of which it is composed being 56,000 pounds?

*Ans.*—The tensile strength given is the ultimate or breaking strength of bar iron, in pounds per square inch, and assuming a factor of safety of 4 or 5, the safe strength of the iron may be taken as, say 12,500 lb. per sq.in. The sectional area of a bar 1 in. in diameter is $0.7854 \times 1^2 = 0.7854$ sq.in. The safe load, or the load such a bar will carry is, therefore, $(0.7854 \times 12{,}500) \div 2000 = 4.9+$ tons.



# FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

## America's Export Coal Trade Dependent Upon Return Cargoes

### Our Export Trade in Coal Is Bound to Increase, But Permanency in Foreign Markets Depends in Great Measure on the Way We Treat Foreign Consumers

Great interest has recently been manifested by the Government Departments concerned with matters of foreign trade in the question of the coal export trade of the United States. The world's rapidly increasing consumption of coal and the dominant position of the United States as the owner of 55 per cent of the world's coal reserves seem to make it inevitable that the United States should participate to an increasing extent in the coal trade of the world. Not all of the coals of the United States are of a quality which would enable them to compete in the markets of the world. Reserves of high-grade bituminous coal which might successfully compete with British coals are mainly in the Appalachian field, and while large, possibly in excess of 40 billion tons, are far from inexhaustible. Furthermore, the ratio of annual coal output to reserves in the high rank coals is at present nearly tenfold that of the lower rank coals, indicating that our best coal will be the first to be exhausted.

Furthermore, although it seems assured that there will be available in from one to two years sufficient tonnage for the exportation of largely increased amounts of coal, nevertheless it is important that our ships should be used in the most advantageous manner; and from the standpoint of fostering domestic manufacturing industries it is better national policy to export manufactured products rather than raw materials. From the standpoint of economy in shipping space and profit, coal is a bulky and comparatively cheap commodity, and is therefore not an attractive cargo.

The small export coal trade in the United States is frequently compared disparagingly with the tremendous coal trade of Great Britain, but it must be remembered that Great Britain is essentially an importing nation and that much of her coal is exported in space that would otherwise be occupied by ballast. The United States, on the contrary, is in precisely the reverse situation, being essentially an exporting nation, and to force our export of coal under these conditions is to work contrary to normal tendencies.

In spite of the considerations just cited there are cogent reasons why the coal export trade of the United States is likely to materially increase within the next few years, and it is reasonable to believe that the United States may acquire a permanent foothold in many of the coal markets of the world. The information coming from Europe indicates that the coal production of Great Britain and Germany has been so reduced as the result of the war that there is now, and probably will be for several years to come, a great coal shortage in Europe unless the deficit is made up by the United States Neglected development work in many European mines during the war and the wrecking of mines in France add to the difficulties of early resumption of normal production. It is probable, therefore that the United States will as a measure of industrial relief be called upon to supply large amounts of coal to Europe; but, while American exporters may acquire a temporary foothold in certain of the European markets they will unquestionably face the possibility of being unable to compete in these markets when normal production is again resumed in Great Britain.

Certain other markets are virtually dependent upon the United States for their coal supplies—for example, the West Indies and Central America. Our present coal trade with these countries will presumably gradually increase, and may be extended permanently to certain parts at least of South America. An additional reason for encouragement of the export of coal is found in the added bunkering facilities which will be needed for our merchant marine so as to facilitate the export of products other than coal and to insure favorable coal prices for United States vessels bunkering in foreign ports.

Whether or not the United States eventually expands her export trade in coal to a magnitude comparable to that of British trade, the trade developed should be built upon the secure foundation of just and equitable treatment of foreign consumers, and, to insure this, provision should be made for grading and inspection of coal for export, either through the agency of the Government, the Coal Exporters' Association, or through some joint arrangement, so that the foreign consumer may be reasonably assured that he will receive the grade of material for which he places his order. Only through the building up, by such practice, of a reputation for integrity and efficiency can American exporters hope to retain permanently markets which may be acquired under the unusual conditions of the next few years.

## Marine Strike Affects Exporters of American Coal

A tnreatened general tie-up of shipping along the Atlantic coast because of the refusal of private boat owners and the United States Shipping Board to grant the demands of the Marine Firemen, Oilers and Water Tenders' Union faces the coal industry. On Monday of this week the labor leaders claimed that between 250 and 300 vessels were idle in the New York harbor because of the lack of men and that men were leaving their vessels at all the ports from Portland, Maine, to Galveston, Texas.

The men demand a closed shop, three watches of eight nours each to replace the present system of two watches of twelve hours each, and an increase of $15 a month in pay. The Shipping Board and the American Steamship Association, the members of which are the private boat owners, have agreed to advance the wages of the men 10 per cent., but refused an eight-hour day except when tne vessels are in port, and also refused preference to union workers in employment. This reply of the owners and the Shipping Board was rejected as not satisfactory by the union, and it was predicted that the strike would spread and that other unions would be involved. It was also predicted that the strike would spread to transatlantic vessels.

Coming at this time the trouble may prove of serious consequences to exporters of coal who are just developing foreign markets for this country's fuel. Many of them have closed contracts for large tonnages and prompt shipments, some of which are based on present freight rates. So far no serious delay has taken place because of the partial tie-up inaugurated. Shippers of bunker coals are already beginning to feel the effects of the strike, and unless it is quickly settled it is evident that embargoes will have to be ordered on shipments within a couple of days.

## Lower Cost of American Coal Output Helps Export Trade

The advantage in the matter of exporting coal enjoyed by Great Britain and Germany is likely to be offset, under new conditions, it is pointed out by Dr. J. B. Umpleby, of the Foreign Minerals Division of the Geological Survey, who recently returned from the Peace Conference. The United States is handicapped by the fact that its export coal is from 300 to 400 miles away from tidewater and must pay an average freight charge of $1.40 a ton to place it at shipside. The effect of the rise in labor prices, however, is much greater in Europe than in the United States because of the greater output per man in this country. In support of such a contention, Dr. Umpleby cites the figures about to follow. The last figures available are those of 1912, but the general relation is the same. The value of coal at the mine and the output per person employed was:

| | Average Value per Ton at Mine | Annual Output per Person Employed |
|---|---|---|
| Belgium | $3.24 | 155 |
| France | 3.05 | 200 |
| Germany | 2.52 | 269 |
| United Kingdom | 2.18 | 244 |
| United States | 1.44 | 660 |

The production and consumption of all classes of coal per capita in 1912, as shown by Dr. Umpleby, is as follows:

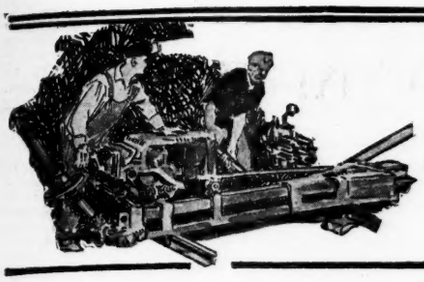
| | Production, Tons | Consumption, Tons |
|---|---|---|
| United Kingdom | 5.70 | 3.83 |
| United States | 5.00 | 4.82 |
| Belgium | 2.99 | 3.35 |
| Germany | 2.59 | 2.12 |
| France | 1.00 | 1.48 |
| Austria-Hungary (1911) | 0.31 | 0.52 |
| Spain (1911) | 0.18 | 0.31 |
| Russia (1911) | 0.15 | 0.19 |
| Sweden | 0.06 | 0.96 |
| Italy | Small | 0.28 |

In 1912, Great Britain exported 67,000,000 metric tons of coal. Germany exported, during the same year, 39,000,000 tons. In the five-year period from 1907 to 1912, British exports increased 1.4 per cent., whereas German exports increased 58.3 per cent., showing the great inroads that Germany was making in England's export coal trade before the war. The changed situation in Europe will curtail, to a great degree, the coal exports of each of these countries, with the obvious deduction that the United States has a chance to get the business.

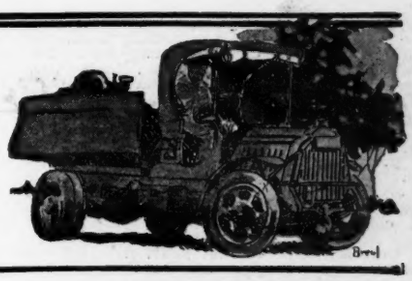
## Cost to England of Control of Coal Industry

The parliamentary report of the London *Daily Telegraph* of May 19 states that the liabilities of the British Government in connection with the control of coal mines in the current financial year will amount to about $130,000,000, made up of: Wages and hours concession to miners, $100,000,000; compensation under control agreement, $24,000,000; emergency claims (advances), $5,000,000; indemnity to coal merchants, $750,000. The emergency claims are for the purpose of keeping open collieries which mignt otherwise be closed and making good extraordinary loss or damage, etc., while the indemnity to coal merchants represents the estimated loss arising during emergency arrangements for diversion of coal from its normal channels of distribution.

The Government of India will gradually relinquish its control of coal and abolish the present distribution system.



# COAL AND COKE NEWS



## What Happened in June

[The bracketed figures in the text refer to the number of the page of the volume in which references to the matter noted may be found and should the reader desire further information he can obtain it in the place indicated.]

June 1—A new coal agreement is concluded between Germany and Switzerland for the monthly delivery of coal and coke [XVI, 75].

June 2—The final report of the Canadian Fuel Controller is presented to the Canadian House of Commons [XV, 1184]—Senator Davis introduces a bill in the Pennsylvania Senate relative to mine cave conditions in the anthracite field [XV, 1101]—Mine workers at the Creighton and one other mine in Allegheny County, Pennsylvania, go on strike to compel a recognition of the miners' union [XV, 1132]—The final report of the Canadian Fuel Controller is presented to the Canadian House of Commons [XV, 1184].

June 3—The Second Pan-American Conference begins a four-day session at Washington, D. C., with delegates from North and South America in attendance—The Pittsburgh Coal Producers' Association holds an important meeting at Pittsburgh discussing the present and future coal situation [XV, 1102].

June 3 to 4—The West Virginia Coal Mining Institute holds its twentieth semi-annual meeting in Huntington, W. Va., at Hotel Frederick. Papers are read and discussed [XV. 1018].

June 4—The Pennsylvania Senate passes the McConnell bill relating to insurance [XV, 1101].

June 4 to 5—The Western branch of the Canadian Mining Institute holds a meeting at Nanaimo, B. C. [XVI, 66].

June 5—An ignition of powder takes place on a man trip in the Baltimore tunnel of the Hudson Coal Co., at Wilkes-Barre, Penn.; 92 men lose their lives as a result [XV, 1076].

June 10—The annual meeting of the West Virginia Coal Association is held at Huntington, W. Va., when officers are elected and the question of a continuation of Government supervision of the coal industry is discussed [XV, 1183].

June 11—The employees of Vesta No. 5, of the Jones and Laughlin company, return to work after a strike of eight weeks [XV, 1173].

June 12—A strike takes place at the mines of the West End Coal Co., in the anthracite field, 1500 mine workers going out [XV, 1173].

June 15—A secret session of past and present chiefs of the United Mine Workers of America is held at Atlantic City, N. J. [XV, 1172].

June 16—Two hundred coal miners at the Franklin-Tandy-Low mine near Brazil, Ind., strike when company ceases giving a bonus of 6c. a ton [XV, 1173]—After a strike of one week, the Norfolk & Western Ry. motive power employees return to work [XV, 1173]—A strike of the Federation of Miners of France takes place, involving all the mine workers of that country, on a question of working time [XV, 1132].

June 17—The Flynn anti-sedition bill is defeated in the Pennsylvania House of Representatives [XV, 1183].

June 18—The coal mine superintendents of Peoria, Fulton and Tazewell counties, Illinois, meet at Canton, perfect an organization and elect officers [XVI, 36].

June 23—The American Federation of Labor meeting at Atlantic City declares itself in favor of a universal 44-hr. week [XV, 1172].

June 23-24—A conference of prominent educators is held in Washington, D. C.; the economic and business training of engineers being discussed [XVI, 65].

June 23-25—The coroner's jury sits at Wilkes-Barre, Penn., on the Baltimore tunnel disaster of the Hudson Coal Co. It refuses to fix the blame for the accident [XVI, 55-58].

June 25—Bills are introduced in each house of Congress proposing that the Federal Department of the Interior become the Department of Public Works [XVI, 17].

June 26—The Williamson Operators' Association holds a meeting and banquet at Williamson, W. Va. [XVI, 36]—Jerome Watson, chief deputy and safety commissioner of mines of the state of Ohio, sends a communication to the operators and miners of that commonwealth relative to the conveying of explosives into mines [XVI, 78]—A meeting of the executive board of the three anthracite districts of the United Mine Workers is held at Wilkes-Barre, Penn., to decide on details of the next tridistrict convention [XVI, 25].

June 26-28—The conferences started at Atlantic City commence anew at Charleston, W. Va. [XVI, 64].

June 27—The sedition bill is finally put through the Pennsylvania Legislature and signed by the governor. The bill amending the workmen's compensation law is also signed [XVI, 35]—Joint conferences of operators and mine workers are held in the Alabama district [XVI, 64].

June 28—The signing of the peace treaty takes place in Paris.

June 30—The Fuel Administration passes out of existence [XVI, 21]—An explosion occurs in the No. 15 mine of the Rock Island Coal Mining Co., at Alderson, Okla., with disastrous consequences [XVI, 79].

## Harrisburg, Penn.

Coal producers in the central Pennsylvania field are complaining over the action of Secretary of the Navy Josephus N. Daniels in commandeering coal for the use of the navy. They do not question his right to do so nor the right of the navy to first consideration, but they do assert that he should expand his list of mines producing coal that would be acceptable to the navy. They contend that he steadfastly refuses to take coal from large producing mines, whose output is just as available for ocean shipping as that which he is now relying upon.

They also complain against his right to fix the price, pointing out that if coal is commandeered at a price below what they get in the market it is nothing more nor less than confiscation. An adjustment can only be obtained through the court of claims, which sometimes takes four or five years.

The operators in this section say there is no trouble at present in the car situation, but a shortage is anticipated later, particularly on the Pennsylvania lines. Many cars are being used in hauling coal to the Lakes for the Western trade and on the return trip they are utilized for hauling ore to the steel plants. The Pennsylvania R.R. is usually shorter on coal cars than most of the other roads, for the reason that its lines extend through a greater coal producing district than most of the other roads, with the result that its cars must be sent over other lines in hauling the coal to its destination.

It is manifestly impossible to secure either labor or cars to handle a year's requirements of coal in seven months, which is what must be done if people will not place their orders for coal during the summer, when orders are needed, and it is for this reason that operators welcome a brisk demand at this time.

The Governor, on July 10, signed the Crow Bill, allowing coal companies to tunnel under rivers, providing they pay for the coal taken while tunneling.

## Sunbury, Penn.

Anthracite coal land valuation has been a matter of much interest for the past few months. Considerable activity in this direction has been shown by the Northumberland County Commissioners who some time ago appointed T. Ellsworth Davies, of Scranton, as a mining expert to adjust coal land valuations for taxation purposes. Mr. Davies died before his report was finshed and the task fell to his assistant, W. F. Sekol.

It is generally accepted that anthracite coal land valuations will be advanced approximately $50,000,000 for the next 3-yr. period. In the case of Northumberland County, the bonded indebtedness is the reason advanced why taxes should be increased. There is a persistent demand that coal land valuations be increased and that it be not merely nominally. It is claimed that with the coal companies paying taxes on proper valuation, that it would be possible to pay off all county bonds as they come due. It is said that the valuation of all other lands in the county in question is about 50 to 60 per cent. of the full market value and it is thought that coal companies should be assessed on a like basis.

In his report to the Northumberland County Commissioners, Mr. Sekol recommends that coal in the ground be valued at 8c. per ton. In the case of the Susquehanna Collieries Co., Mr. Sekol's estimate as to the tons of coal unmined—29,000,000 tons—agrees closely with the result arrived at by the engineers of the Susquehanna company. The county commissioners assess the coal lands of the Susquehanna company on a valuation of $2,346,000 or about four times last year's valuation.

The appeal of the Susquehanna Collieries Co. from the assessments fixed for lands held by that corporation were heard on July 11 and it is understood that this company will carry the fight before the County Courts for final decision. The mine officials agree that some increase over present assessments is justified as assessments in general have gone up with values all over the country; the Susquehanna company is said to have agreed to double the former valuation in its appeal for a reduction of assessment.

It seems that a similar method of assessment is in effect in other counties. Furthermore in Luzerne County the assessment is from 14 to 15c. a ton on coal in the ground; in Lackawanna County the assessment is 22c. a ton. However, it is pointed out that in a comparison of rates of assessment, that conditions of seam occurence, cost of mining coal and other considerations should be taken into account.

Based on Mr. Sekol's report, the coal lands of the Philadelphia & Reading Coal and Iron Co., in East Hanover, Rush and Middle Paxton townships were assessed on a valuation of $1,372,814 or about $1,000,000 more than present valuation. The hearing of the appeals of the Philadelphia & Reading company were to be held on July 14.

## Charleston, W. Va.

Mines marked time in West Virginia during the first five days of July, with not enough miners reporting during the week to produce much coal. While, of course, there was a general suspension of operations on July 4, miners frequently took the whole week off so as to be in at the demise of John Barleycorn in nearby states. Under such conditions production declined quite considerably. Indeed, it is doubtful if it reached as much as 50 per cent., taking the state as a whole, that being a loss of 25 per cent. or more for the whole state. However, it was regarded as certain that losses would be recouped to some extent during the second week of the month under favorable conditions. But for holi-

day conditions just described, there would probably have been an unusually good production because circumstances were favorable to full time operation; there were plenty of cars on hand in nearly all fields, while market conditions, generally speaking, were tending to stimulate the production of a larger tonnage. That was true beyond question as to smokeless coal both in prepared sizes and run-of-mine, the export demand for which was said to be lively; however, the demand for smokeless coal was not confined to export markets. In central southern West Virginia, territory production during June was in excess of that for June of last year, that not applying of course to the Pocahontas field where a strike held back production to a serious extent. While it appears to be difficult to move high-sulphur coal at the present time, on the other hand there is a pronounced demand for low sulphur fuel in eastern markets. At the outset of July there seemed to be a growing market for steam coal but such improvement as was observed was confined to eastern consuming areas. Prepared sizes of coal from the high-volatile fields were finding a ready market at better prices than in previous weeks, but mine-run and slack were not quite so active especially as to spot sales; there were a number of producers who were in no hurry to contract for the delivery of their coal, in view of advancing prices and the prospect of further advances.

Losses in production followed in the New River and Winding Gulf fields in the early part of July, even though cars were furnished in sufficient number to make prompt loading possible, the dearth of miners being instrumental in lopping off many tons of production, the total tonnage mined not being over half of that produced toward the latter part of June. Far from abating, the demand for smokeless coal after July first was heavier than ever, producers reporting an extremely active export market as well as a strong domestic demand from all consuming areas. The average price at which mine-run smokeless was selling, according to the best information obtainable, was $3.50 a ton while as for lump and egg, it was being quoted at prices ranging from $4.00 to $4.50 a ton and even higher. Smokeless producers hope it may not become necessary for the navy to adhere strictly to the requisition for smokeless coal, as Secretary Daniels recently indicated it was the intention of the navy to do.

Little attempt was made in the Kanawha region during the first week of July to produce any large amount of coal, it being out of the question with so large a portion of the miners away in quest of pleasure. Otherwise, so far as the car supply and markets were concerned, an increased production over previous weeks might have been possible, but for apparent reasons shipments were only about half as large as during the last week of June or approximately 100,000 tons, perhaps not that much. Developments up until July 8 did not disclose much variation from previous weeks, at least as to mine-run and slack, which are not as yet being produced to the maximum; this was owing to the fact that there is not as lively a market for such coal as there is for prepared sizes. Producers gave it as their opinion that sales of mine-run, spot, were not being made on any considerable scale at the outset of the month; prepared sizes, however, quoted to jobbers at $3.25 and to the trade $3.50 being extremely active. The general average price for spot, mine-run, during the week was $2.10, contract from $2.25 to $2.35.

## Fairmont, W. Va.

While the holiday at the end of the week made inroads on the output of northern West Virginia fields during the period between June 30 and July 5, yet during the first three days of the week in question a record for the present year was established in this section, shipments of coal exceed ing in volume those for any like period since the latter part of 1918; at least that was true as to the mines in the Fairmont field. By the middle of the week, however, the mining and loading of coal began to diminish and for the last two days of the week production was light. The car supply during the first part of the week referred to was much better than that witnessed at the end of June. The number of idle mines in the field is being rapidly cut down. Shipments to Curtis Bay throughout June and, in fact, during the first few days of July, were unusually heavy, a large proportion of such coal being for export. The first week of July also brought a revival of the demand for northern West Virginia coal at Lake ports, there being a most perceptible increase in shipments to such points. There is this difference, however, in the sale of northern West Virginia coal: the low-sulphur coal is being readily sold while high-sulphur coal is not moving with so much alacrity. Formerly the high-sulphur coal was sold at Cleveland and other points, but adverse freight rates are debarring that kind of fuel from the Lake markets, it being found impossible to compete with Illinois and Indiana coals in that respect.

## Huntington, W. Va.

An embargo of three days' duration as well as the holiday of the Fourth reduced production in the Logan mining district during the week ended July 5 to the tune of 57,000 tons or the difference between 237,000 and 170,000 tons. However, such a loss was rather to have been expected as production for the same period last year was only 175,000 tons. During the week ended June 28, a labor shortage was responsible for the loss of 8000 tons. In the following week the loss from the same cause was 33,000 tons. While labor shortage was on the increase, car shortage losses were being decreased from 30,800 tons to 10,589 tons. Mine disability losses were doubled, however, from 4600 tons to 9400 tons. But further improvement was observed in the market for Logan coal, there having been during the week ended July 5 a loss of only 6.49 per cent. of capacity amounting to 15,983 tons, as against a loss of 7.72 per cent. during the preceding week.

Figures compiled by the Guyan Operators' Association disclose the fact that the output of coal in the Logan field for June, 1919, was somewhat larger than the output of June, 1918; the tnnnage for June, 1919, being 902,693 tons as against 902,484 for June, 1918, the average production for the month being nearly 70 per cent. Of a total loss in production during June, of 419,353 tons, the car shortage prevailing during the early part of the month was responsible for half or for 201,348 tons, there being a loss of 145,000 tons from no market.

The embargo, referred to in the foregoing paragraph, greatly reduced shipments from the Logan region to Lake ports via Toledo. It became effective July 3 and lasted over July 5, a congestion on Lake coal carrying roads and a shortage of vessels at the Lakes making it necessary to impose embargo restrictions.

## Bluefield, W. Va.

As was true in nearly every other field of West Virginia, production was lowered in the Kenova-Thacker district during the week ended July 5 to the extent of 22,000 tons, dropping from 110,000 to 88,000 tons; this was, briefly, because of a shortage of miners due to the holiday, the shortage from such a source increasing from 4000 to 13,000 tons, or from 2 to 8 per cent. of full time capacity. On the other hand, the car shortage loss was cut down from 15 to 11 per cent., or from 26,000 to 18,000 tons. A better market was shown for Kenova-Thacker coal, the "no market" losses being cut in two, the tonnage loss coming down from 22,000 to 11,000 tons. Production only reached 56 per cent. of capacity as against 62 per cent. for the week ended June 28.

Largely because of a holiday among the miners lasting until Monday July 7, Pocahontas mines failed during the week ended July 5 to maintain the output at the mark of 336,000 tons set during the previous week, production dropping down for the time being to 237,000 tons, a difference of nearly 100,000 tons. An idea of the extent to which lack of miners affected production may be obtained from the figures covering that particular item of tons, 46,947 tons, as compared with 10,467 tons for the previous week. A loss of 27,000 tons, on the other hand, was cut off insofar as a shortage of cars was concerned. There was a market for all Pocahontas coal which could be produced. Coke production slumped to 4887 tons.

## Duquoin, Ill.

The United States Fuel. Co. has started operations installing large coke ovens near its mine at Benton, in Franklin County, and it is estimated that within the next few years practically all of the coal which is mined in this county will be transformed in byproduct ovens, into the three score valuable products which the commercial world is now using extensively. The United States Fuel Co. at the present time controls 33,000 acres of coal land in Franklin County and it has tested the coal in its mines in this district; the test proving successful, the company is now ready to do business on a larger basis. In addition to the many large and up-to-date mines which this concern operates in this section, it has also recently put into use the largest washer in operation.

Ground has been broken and tons of machinery are arriving daily, preparatory to the erection of the plant which will cost in the neighborhood of $3,000,000 and cover about 25 acres of ground. Heretofore only eastern mined coal in West Virginia and other places, has been successfully put through the retort oven process, but recent tests made by the company show that Illinois coal is capable of being successfully handled in the byproduct ovens. There are 12,000,000 tons of coal being mined annually in Franklin County by 13,000 miners and at the present there are 4 or 5 additional large mines being sunk. The sinking of these mines together with the installing of coke ovens will greatly increase both the tonnage of coal and the number of miners in this district. The entire output of the United States Fuel Co., will be put through the Semet-Solvay process in byproduct coke ovens.

In anticipation of an unprecedented increase in the volume of coal traffic in this section of southern Illinois coal fields, the various railroads operating through the section are making provisions for handling this business more efficiently and are appropriating thousands of dollars for this purpose. The Illinois Central has completed a large roundhouse in Duquoin and has five miles of new switching tracks to handle the thousands of cars which pass through here from Jackson, Williamson, and Perry and Franklin counties. The Illinois Central tracks in this city are the "clearing-tracks" for the long trains which come in daily from these adjoining counties. A large roundhouse has been completed at Carbondale to handle the business over the Carbondale-St. Louis, Carbondale-Herrin and Carbondale-Paducah, Ky., divisions. The Illinois Central has also commenced surveying in the southern part of Jefferson County, for a branch line to run through the coal fields in that region, which have had inadequate transportation facilities for sometime.

## Kansas City, Mo.

The board of directors of the National Coal Association held a meeting at the Baltimore Hotel, Kansas City, on July 9. The session lasted a little over an hour, during which time several important questions were brought up and discussed. Among these was a resolution urging the Director General of the United States Railroad Administration to make every effort to better the transportation conditions which have reached a crisis. Director General Hines was requested to make an official statement as to the present situation and also details of any action contemplated by the board to better the situation for the public's relief in the pressing coal shortage.

Vice President J. D. A. Morrow brought out the fact that the Government had failed to provide money to get out the weekly report on coal conditions and said that if the report was to continue, something had to be done immeditely. President H. N. Taylor of the National Coal Association authorized the payment of a sum to carry on this work until the board could handle it. In the meantime the association would have Congress pass a bill to take care of the situation.

The Southwestern Coal Association presented an impressive and befitting testimonial to Mr. Taylor, in recognition of his splendid services to the Government, as assistant to Dr. Garfield, while representing the Railway Administration in the Southwestern territory.

## Canada

**Victoria, B. C.**—Questions of direct interest to those identified with the coal industry in the Pacific Northwest came before the delegates to the International Mining Convention held at Nelson, B. C., June 19 to 21. Among matters discussed was the present strike of the coal miners in District 18 (U. M. W. of A. eastern British Columbia and the Province of Alberta). It was explained that the tie up in the Crow's Nest coal field was having a serious effect on the metal industry as the lack of coke interfered with the efficiency of the smelters, the industries referred to depend-

ing to a large extent on Fernie coke, to maintain operations. For this reason a resolution petitioning the Dominion Government to intervene in order that a settlement of the labor difficulties may be reached was carried unanimously.

Another matter receiving considerable attention was the use of powdered coal in British Columbia in the nodulizing of copper sulphide concentrate. Some difficulties of operation had been experienced but experiments seemed to show that powdered coal could be used provided proper equipment was employed. As coal dust firing was being used at reverberatory works and under boilers of various types in other sections and countries, a similar arrangement no doubt could be worked out for a nodulizing kiln. Touching on the question of costs it was estimated that between 12 and 14 tons of concentrates were treated with one ton of coal; the coal was charged at $5.00 a ton pulverized and in the bin. The popularity of powdered coal as a fuel was commented upon and it was thought that this development would result in making certain so-called semi-lignite coal of British Columbia a commercial possibility.

Dealing with the iron and steel industry in British Columbia, Dr. E. T. Hodge, professor of geology at the University of British Columbia, stated that there was plenty of good metallurgical coal available for the maintenance of a large smelter in the province. As to Vancouver Island coal it had been subjected to some experiments but he did not think that it could be definitely said that it was not a good coking coal until it had been tried in byproduct coke ovens. The coal of the Nicola-Coalmont-Princeton Field, however, had been established as a fine metallurgical fuel. Coal dust, too, had been used to advantage in a blast furnace, so that, all things considered, there was no problem in connection with the securing of an adequate supply of fuel for the proposed iron and steel industry.

In connection with the mineralization of northern Manitoba, some of the problems to the development of this section were noted, among them being the fuel problem. Coke was priced so high that its utilization was almost prohibitive but it was thought that powdered coal might be used here.

The output for the coal mines of British Columbia for the month of May, 1919, was as follows:

VANCOUVER ISLAND

| | Tons |
|---|---|
| Western Fuel Co., Nanaimo collieries | 48,012 |
| Canadian Collieries (D), Ltd., Comox collieries | 44,297 |
| CanadianCollieries (D), Ltd., Extension collieries | 20,068 |
| Canadian Collieries (D), Ltd., So. Wellington | 7,783 |
| Pacific Coast Coal Mines, Ltd., Morden colliery | 6,170 |
| B. C. Coal Mining Co., East Wellington colliery | 1,508 |
| Nanoose Collieries, Ltd., Grant colliery | 397 |
| Granby Consolidated M. S. & P. Co., Cassidy | 6,887 |
| Total | 135,122 |

CROW'S NEST PASS COLLIERIES

| | |
|---|---|
| Crow's Nest Pass Coal Co., Coal Creek colliery | 26,064 |
| Crow's Nest Pass Coal Co., Michel colliery | 14,024 |
| Corbin Coal and Coke Co., Corbin colliery | 4,287 |
| Total | 44,375 |

NICOLA-PRINCETON DISTRICT

| | Tons |
|---|---|
| Middlesboro colliery | 3,108 |
| Fleming Coal Co | 2,649 |
| Merritt colliery | 771 |
| Coalmont colliery | 706 |
| Princeton colliery | 1,095 |
| Total | 8,229 |

**Alberta Province**—Some interesting figures have been compiled by John T. Stirling, chief inspector of mines for this province. The figures show the coal output for the province during 1918 and indicate its relation to Canada's total production. During that year the consumption of coal was approximately 37,237,065 tons, of which 22,057,065 tons were imported from the United States; 2,559,041 tons of this amount were imported into western Canada. In 1918 there were produced in the province of Alberta 6,148,620 tons of coal, 100,470 tons of briquettes and 32,858 tons of coke. During the period in question 317 coal mines were in operation in Alberta. Seventy new mines were opened while nine old mines were reopened; offsetting this to some extent, there were 71 mines abandoned. To operate these mines an average of 2633 persons were employed above and 6144 below ground.

**Anyox, B. C.**—The byproduct ovens of the Granby Consolidated Mining and Smelting Co. are being heated up preparatory to their regular operation. This plant will provide the company's smelter with coke and also recover byproducts. When the company started this works at Anyox, the war was in progress and it was essential that the byproducts of coal should be retained in any coking that was done. Before its plans were completed, however, the armistice had been signed. Now the company proposes to operate its byproduct plant to secure coke for its smelter and recover, treat and market the coal byproducts entirely on a commercial basis. The company is securing the coal for its work at Anyox from the Cassidy collieries, Vancouver Island, where a new mine has been opened, a modern plant installed, and provision made for the housing or employees after modern ideas. Cassidy's output is constantly increasing.

**Portland Canal District**—The revival of interest in metalliferous mining throughout this district in northern British Columbia, has directed attention again to the Groundhog coal fields, as they are colloquially termed. These fields are situated about 90 miles from the mining town of Stewart. Judging from available reports the coal is of high quality and quite plentiful. To open up the district, railroad construction would be necessary and three feasible routes are being discussed. The shortest would be from Stewart, at the head of Portland Canal, from which point a railroad has been built 15 miles in the direction of the coal fields. Another route would be from tidewater up to Naas River, but this would be 80 miles longer; however, there would be less rockwork and an easier grade. A third possible route is from the Grand Trunk Pacific Ry., at Hazelton, about 150 miles southward. The Groundhog coal fields have been reported upon by a number of engineers and are known to extend some 70 miles, the strip being over 30 miles wide over which coal outcrops in different places.

## PENNSYLVANIA

### Anthracite

**Lansford**—Six men are dead and ten others are seriously and probably fatally injured as the result of an explosion of gas at No. 4 slope at a colliery of the Lehigh Coal and Navigation Co. at this place, shortly before quitting time on July 9. Most of the injured are in the state hospital at Coaldale. The cause of the explosion is not known; most of the injured were working up on a heavy pitch when the explosion took place, and were supposed to be using safety lamps. It may have been caused by a spark from an electric locomotive as the motorman was killed while working under his machine; or a large body of gas might have been ignited. Little damage was done to the mine workings, and the colliery was operated the next day. Seward E. Button, Chief of the State Department of Mines, has directed inspectors I. M. Davies, Evan G. Evans, A. B. Lamb and B. I. Evans to make a thorough investigation.

**Wilkes-Barre** — All the compensation cases growing out of the Baltimore tunnel disaster of the Hudson Coal Co. at this place were adjusted by July 9. It required exactly a month to settle satisfactorily more than 130 cases.

The estimated average compensation awarded in each fatal case where there is a widow or dependent parents is $4000, to be paid over a period of years. The compensation, exclusive of the disability cases, will amount to about $325,000; 138 children under 16 years of age will be benefited.

Agreements have been signed by 56 widows and 12 dependent parents. Of the 45 disability cases, 37 have entered into the compensation agreement; 36 out of the 37 men received the maximum compensation paid to them until they are able to return to work.

The promptness with which these cases were closed up and with everybody satisfied, may put a damper on agitation to compel the coal companies to carry their insurance with the state rather than in their own organization.

### Bituminous

**Uniontown**—The sale of the Nellie mines, one of the properties developed under the firm of Brown & Coheran, to Gaetano Corrado, for $20,000 was approved by Judge J. C. Work of the Orphans' Court on a petition presented by E. C. Higbee for M. M. Cochran, surviving trustee. The mine, located in Dunbar and Franklin townships, is now worked out. The mine was one of the first opened by Captain Samuel Brown and the late James Cochran in the lower Connellsville region. W. Harry Brown, representing the Brown estate, approved of the sale.

**Homer City**—The Rochester & Pittsburgh Coal and Iron Co. have closed their Lucerne Shaft No. 3 mine at Lucerne mines, near here. All the coal from the No. 3 workings will be taken out through the No. 1 and 2 mines, thus saving the hoisting of the coal up the shaft. Men will be taken to their work in man-trips instead of being lowered down the shaft. The electric mine lamp houses have been combined and are now located at the sub-station at the entrance to the two drift mines. The new lamp house has about 1,000 lamps to give out daily.

**Fayette City**—Three men were killed and seven others were seriously injured on July 7, by a fall of rock and earth in the O'Neill mine of the Pittsburgh Coal Co., near this place. Approximately 300 miners were imprisoned in the workings by the cavein for 1½ hours. The rock and earth fell without warning and buried the ten men before they could escape. After an hour and a half of hard work the buried men were reached and removed from the mine. The men who were killed and injured were boarding a mine car to be taken to their working places when the accident happened.

## WEST VIRGINIA

**Richwood**—The Elk Lick Coal Co. is about ready to begin the shipment of coal from its new plant near this place, in Nicholas County. All machinery is installed in the new tipple. The company has a large acreage of coal in the Sewell seam which it will develop.

**Beckley**—Twelve directors of the E. E. White Coal Co. were sufficiently interested in the employees to make a trip recently in a special train from Philadelphia to Glen White, near this place, to participate in the celebration there in honor of employees who have returned from service overseas.

**Olcott**—There was a disastrous flood in the Briar Creek Valley near Coal River, the bridge of the Kanawha Central railroad across Briar Creek near here being swept away. Of course that necessitated the cancellation of all trains and it is estimated that it will require a month to repair the damage brought about by the storm and flood. Several coal companies operate in the neighborhood of Olcott.

**Short Creek**—United States mine rescue crews have been fighting a fire in the Beech Bottom mine of the Richland Block Coal Co., of this place. The damage to the mine is heavy but it is hoped that the fire will be speedily subdued and that temporary repairs will make it possible to operate the mine. Several hundred employees are idle because of the fire. A short circuit following a fall of slate started the fire on July 3, at a time when only a few men were in the mine; fortunately they all escaped.

**Hartland**—Progress is being made by the Lima Coal Co. in getting its mine at Leatherwood ready for operation although considerable work yet remains to be done. The company is driving entry, is beginning actual construction work on its tipple and is also ready to begin laying track for the siding leading to its operation. As the Elk River will separate the mine from the tipple, a conveyor system is being installed. The secretary of the company, M. P. Goetschons of Lima, Ohio, is giving his personal attention to the work of construction.

**Bluefield**—Virginia and West Virginia business men have consummated negotiations with the Black Eagle Coal Co. for the purchase of about four thousand acres of coal land as well as for the other assets of the company, paying therefor in the neighborhood of $300,000, the property being in the Harlan field of Kentucky. The Black Eagle company has for some time been mining coal at two mines in the field. Among the purchasers of the land and mines referred to were F. C. Nelkerk, of Graham; C. B. Smith, of Maybeury; C. E. Wagner, of Bailey; C. M. Graham, of Graham; W. F. Harman, of Tazwell; W. R. Graham and E. T. Tyree, of Bluefield.

**Mt. Hope**—Two large companies in the New River field effected a consolidation on July 1 and in the future will be known as the East Gulf Coal Co. The companies combining were the East Gulf Coal Co. and the Simall Coal Co. The latter is a new company organized a few months ago by Dr. Gory Hogg, S. A. Scott, J. Paul Stevens and others. Since its organization much headway has been made in getting a plant ready for operation. In order to cover the purchase, the capital stock of the East Gulf company was increased from

$500,000 to $800,000. The directors for the companies as reorganized include P. M. Snyder, J. L. Bumgardner, S. A. Scott and C. H. Grose. The officers elected were P. M. Snyder, president and general manager; J. L. Bumgardner, vice president; L. S. Tully, secretary and treasurer; P. C. Thomas, assistant general manager.

### KENTUCKY

**Mt. Savage**—The Frostburg Big Vein Coal Co. has taken over Union No. 1 and No. 2 mines, formerly operated by the New York Mining Co. By this transaction the new company, it is stated, will become the second largest producer of "Big Vein" coal in the Georges Creek region.

**Jenkins**—The Elkhorn Collieries Co., of Huntington, now operating here, is opening a new mine near Wheelwright, Ky., on the Left Fork of Beaver Creek, in Floyd County. The new location will be known as Redhall and shipments are expected to be made from this place by the end of summer. The mine is being opened on the Elkhorn seam. The company recently increased its capital stock to $100,000. The officers are as follows: B. L. Priddie, president; H. B. Hagen, vice president; R. W. Brunk, secretary and general manager—all of Huntington. These officers, together with J. F. Ratcliff and R. E. Bruns, compose the board of directors. Arthur Brunk is manager of the mine at Jenkins.

**Louisville**—While movement of river coal has not been very heavy the river coal companies have been bringing down enough coal to fully supply all concerns with equipment for handling river business. The T. J. Hatfield, one of the largest tow boats on the Ohio, recently took a large tow of empty boats from the Falls Cities to the West Virginia mines. There have been excellent river stages.

There is no relief for the 1,000 shop men out at Louisville, under orders af the Railroad Administration, and not much prospect for improvement of car conditions. It has been announced that the lay-off will continue through July; it is not known what plan will be followed in August. However, many of the men are going into other industries, which will probably result in a shortage for shopmen, and a long period of bad cars.

The coal operators of the Louisville district, in fact the coal trade as a whole in this section is mighty glad to see John Barleycorn put out of business. While the average coal man is not a prohibitionist, he has been forced to recognize the effect of booze on labor, and troubles that come up, which could be averted if whiskey did not reach mining camps, especially during labor troubles. The greater part of the coal mining regions of the state have been dry for some time past, but booze has slipped in regardless of all efforts to keep it out. In the eastern Kentucky mountain district the moonshiners have been a thorn in the side of the coal operators since development was first started, and prospects are for a long and hard fight in this connection. Moonshining has been prospering in the ranges of the Cumberland Mountains in spite of the "revenuer" and has been especially noticeable since taxes climbed and values became greater. However, reduction of outside competition will result in keeping the miners closer at home, and reduce week-end trips to wet territory.

### ILLINOIS

**Springfield**—Ten coal mines near here have been closed down because of the lack of work, these being the Capitol, Dawson, New North, Old Citizens, the two at Lincoln, two at Girard, one at Cantrall and the Tuxhorn mine. Other mines in the Springfield territory are working about two days each week.

**Christopher** — The inspection of Mine No 10 of the Old Ben Coal Corporation, at this place, Franklin County, is now being made by Joseph C. Thompson, director of State Department of Mines and Minerals and Archie Nelson and James Taylor, state mine inspectors. A recent explosion at this mine on June 6, in which three men were killed, is the reason for this inspection.

**Herrin**—The surface plant of the Hafer Washed Coal Co., at Carterville, was destroyed by fire on July 8 when the engine room caught fire from defective wiring. The blaze started about 5:30 p.m. after the day shift had come up and before the night crew went below. The structures were of wood and the estimated loss is over $100,000. Several coal cars were also destroyed.

The large new $90,000 power plant of the Big Muddy Coal and Iron Co. at Clifford was put in operation on July 1. This plant furnishes power to No. 7 mine here and to No. 8 at Clifford as well as a washer at each of these places. The Public Service Corporation power supply was so irregular that the installation of this plant was necessary. Other mines are expecting to have to follow suit.

**Sesser**—The Old Ben Coal Corporation has acquired the big mine here of T. C. Keller & Co., of Chicago. The daily output is 3500 tons with 6000 acres of unworked coal. This gives the Old Ben people eight mines in Franklin County making them one of the leading producers in the field. The other mines operated by this company are: three at Christopher; two at West Frankfort; one at Buckner and one at Pershing.

**Westville**—The United States Fuel Co. recently completed 60 new houses near its mine at Benton, and these houses were immediately filled with families who have been waiting for months for their homes to be finished. During the past year this company has been greatly handicapped for the lack of men, mainly because there were no houses for them to live in. It is said that the company contemplates the erection of more houses in the near future.

**Benton**—The Supreme Court has decided an important case in options on coal rights. Farmers around Waltonville gave 18-month options on their coal without accepting the dollar mentioned in the option. The West Frankfort Coal Co. took options and covered the coal optioned previously. The first option owners sued the farmers and made the coal company a party to the suit. The Supreme Court decided as did the Circuit Court that the first options were not valid. That method of taking options is still prevalent in some sections of Illinois.

### INDIANA

**Georgetown**—The Illinois & Indiana Coal Co. is developing a strip bank east of here. A switch has been put in and the smaller of two steam shovels to be used have been set to work. The company has purchased four tracts which will be used as sites for new mines.

**Vincennes**—The Washington-Wheatland coal mine, located on the county line between Knox and Davies counties, has been sold to a new organization known as the Standard Coal Company. The capital stock is $350,000. The new owners are John T. Oliphant, who has an interest in the Oliphant-Johnson mine; Ira D. Schaffer and John L. Baker.

**Terre Haute**—The Indiana Bituminous Coal Operators' Association was the host July 10 to about 40 mine inspectors from different parts of the United States, who were returning from the Mine Inspectors' Institute which convened in Indianapolis just previous to the Terre Haute visit. Carey Littleton, chief mine inspector, was in charge of the party. The visitors were taken up the Wabash River on the steamer Reliance and a barge and after a bountiful box luncheon inspected the Ferguson and Spears mine at Tecumseh. This mine is known as the "Sub-marine Mine," from the fact that the main entries are driven under the Wabash River to reach the workings that lie on the opposite side. Luncheon was served after the inspection. The following day the visitors went to Vincennes where they were entertained and banqueted by the American Coal Mining Co., after inspecting their mines at Bicknell.

**Vincennes**—More than 40 United States mine inspectors visited Vincennes July 11 and were taken for an automobile ride over the city, and then to Bicknell where they visited mines Nos. 1 and 2 of the American Coal Mining Co., in Knox County and returned to Vincennes for a banquet in the evening. Among the mines visited were the American mines near Bicknell, which for months held the world's record for hoisting in one day.

### ALABAMA

**Birmingham**—Official figures as to the coal and coke output in Alabama for the year 1918 given out by C. H. Nesbit, chief state mine inspector, show 19,521,840 tons of coal and 4,344,726 tons of coke. The by-product coke production last year amounted to 2,611,215 tons, and beehive oven coke 1,733,511 tons. The coal production in Alabama in 1917 amounted to 20,412,841 tons, and 1916 to 18,234,625 tons. Coke in 1917 went to 4,868,598 tons, and in 1916 to 4,385,483 tons.

State Mine Inspector C. H. Nesbitt will hold the mid-year examination of applicants for certificates of competency as mine foremen and bank bosses in his offices in the Chamber of Commerce Building from July 21 to 24 inclusive. An unusually large class is anticipated in view of the fact that the adjourned session of the Alabama Legislature will undoubtedly pass a Workman's Compensation Law, which will naturally cause an increased demand for men holding certificates of competency in the above line of work.

The coal output of the mines of this district for the week ended June 14 was 264,581 tons, an increase of 16,550 over production for the preceding week —an increase of 14 per cent. The increased consumption is largely due to the blowing in of idle furnaces. The Tennessee and Woodward companies have resumed operations at the Alice and Vanderbilt furnaces, respectively. Another of the bessemer furnaces of the Tennessee company will be blown in soon, it is stated. The active stacks of the district will be 20 compared with the recent 16.

A majority and also a minority report is to be submitted to the Alabama Legislature on the convict lease system. An effort is to be made to take the convicts out of the mines and work them upon the state highways. The majority report reviews conditions of convict labor at various industries in the state, citing statements of many witnesses as to inhuman conditions existing in convict camps. The matter is attracting much discussion and there is strong feeling that many of the abuses cited, at least as far as the convict miners are concerned, are much exaggerated. What may have been true years ago seems to have been largely corrected and today those in the mining camps are said to be humanely treated.

### WASHINGTON

**Seattle**—Two new appointments as deputy mine inspectors were announced recently by James Bagley, State Mine Inspector of Washington. The two men receiving appointments were the following who successfully passed examinations held at the University of Washington: John Parker, of Black Diamond, and George T. Wake, of Roslyn, take up their duties under the new safety law which creates places for two deputies instead of one. S. H. Ash, the former deputy, vacated his place to take up other work.

## Personals

**Cleave Fuqua,** formerly mine manager of the No. 6 mine of the Madison Coal Corporation, at Divernon, Ill., has been appointed master mechanic of this company's No. 10 mine at Central City, Ky.

**Frank J. Hayes,** president of the United Mine Workers of Illinois, has been able to leave an Indianapolis sanitarium after a few days treatment. He has been spending a few days at the sanitarium in rest and recuperation.

**J. F. Wellborn,** president of the Colorado Fuel and Iron Co., was elected director at large of the National Coal Association to succeed the late John P. Reese, of St. Louis. He will have supervision of the association's territory west of the Mississippi River.

**Robert Henderson,** fire boss at the Harewood Mine, Canadian Western Fuel Co., has been appointed manager of that mine in the place of Richard Batty, resigned. Mr. Henderson formerly was manager at No. 4 mine, Canadian Collieries (Dunsmuir), Ltd., Cumberland.

**John A. Garcia,** mining engineer, of the Allen & Garcia Co., Chicago, Ill., left on July 7 for a combined business and pleasure trip to Alaska. He expects to investigate the possibility of developing the coal fields in that section, returning the first week in August.

**Charles G. DuBois** was elected president of the Western Electric Co. to succeed H. B. Thayer; the latter was elected chairman of the board. Mr. Du Bois went with this company in 1896; his long association with Mr. Thayer in the administration of the company insures a continuity of policy and methods in the conduct of its business.

**J. G. Bradley,** of Dundon, W. Va., has been appointed by H. N. Taylor, president of the National Coal Association, as chairman of the new subcommittee on Railroad Relations of the general committee on Government Relations. Mr. Bradley is one of the directors at large of the National Coal Association as well as president of the West Virginia Coal Association.

**Ralph E. Sunderland,** of Omaha, vice president and general manager of the Colonial Coal and Timber Corporation, vis-

ited Charleston, W. Va., recently to establish general headquarters for his company. The Colonial company is a $10,000,000 concern and will start active work on its properties shortly. Mr. Sunderland's headquarters will now be in Charleston. **Walter L. Strickler** is the president of this new company.

**F. S. Pfahler,** general superintendent of the Northwestern coal properties in Illinois and Iowa, was appointed the successor of the late John P. Reese as general manager of the coal operations of this company. Mr. Pfahler has made Gillespie, Ill., his headquarters.

**General Richard Coulter,** of Greensburg, Penn., has accepted the appointment of Governor Sproul as one of the three brigadier generals to organize the National Guard of Pennsylvania. His appointment has been confirmed by the state Senate. General Coulter is president of the Keystone Coal and Coke Co., one of the largest coal companies of Westmoreland County, Penn.

**L. C. Sprague,** formerly district manager of sales of the Chicago Pneumatic Tool Co., at New York, has been appointed manager of western railroad sales, with headquarters at the Fischer Building, Chicago. **H. G. Barbee** has been appointed manager of eastern sales with headquarters at 52 Vanderbilt Ave., New York City. **Nelson B. Gatch,** formerly district manager of sales at Chicago, has been appointed district manager of sales at New York succeeding Mr. Sprague.

**Eliot Blackwelder,** head of the Department of Geology of the University of Illinois, whose resignation at the university becomes effective September 1, has already entered upon his new work with one of the large mining companies of Montana, which will take him immediately to New Mexico to do field work. During the coming winter he will furnish the basal ideas upon which a staff of younger geologists will work. Prof. Blackwelder began this work a number of years ago and it will constitute a detailed geological history of the Rocky Mountain region. While with the University of Illinois he has also given courses at Leland Stanford University. Prof. Blackwelder has been appointed a member of the geological division of the National Research Council.

**Judge E. H. Gary,** chairman of the board of directors of the United States Steel Corporation, accompanied by a number of officials of the company, went aboard a steamer on the Monongahela River at Ronco recently and inspected coal roads and the new byproduct plant at Clairton. It is intimated that this visit of the Steel corporation officials anticipates some important changes in the coal and coke producing plants of the company. It is expected that the mines in the upper pools will be pushed to the limit, while other workings will have to be changed to deliver their product to the river. Additional tonnage may have to be found by opening up new properties to keep the big Clairton plant in operation; it will be the largest byproduct plant in existence when completed.

## Obituary

**Elias Hopkins,** inside foreman at William Penn colliery, Penn., shot himself through the right temple while in the mines on July 3. The act was committed in a fit of despondency due to poor health. A widow and five children survive.

**Vincent Mauck,** active in the Danville, Ill., mining field since Civil War days, died July 4 at the age of 84 years. He owned and operated a number of coal mines in the Danville territory. Four of his sons are interested in the coal fields near Danville.

**John Wood,** of Pottsville, Penn., died on July 7, at his home at the age of 70. He had been a superintendent of the Philadelphia & Reading Coal and Iron Co. for 29 years. Among his survivors are George Wood of Hazleton, Penn., division engineer for the Lehigh Valley Coal Co.

**W. A. Hurst,** of Williamson, Mingo County, W. Va., met his death in the New York Central wreck at Dunkirk, N. Y., on July 1. Mr. Hurst was a director of the Winifrede-Thacker Coal Co., of Nolan, and had been re-elected as a member of the Executive Committee of the Operators' Association of the Williamson field only a few days before his death. He is survived by a widow and one son, W. R. Hurst, who was also injured in the same wreck in which his father was killed.

## Coming Meetings

**New York Coal Merchants' Association** will hold its annual meeting Sept. 11-13 at Alexandria Bay, N. Y. Executive secretary, G. W. F. Woodside, Albany, N. Y.

**American Institute of Mining and Metallurgical Engineers** will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

**The National Commissary Managers' Association** will hold its annual meeting August 5-7 at the Sinton Hotel, Cincinnati, Ohio. Secretary, D. J. Eichoff, Manhattan Building, Chicago, Ill.

**Pennsylvania Retail Coal Merchants' Association** will hold its annual meeting July 23 and 24 at Reading, Penn. Secretary, W. M. Berolet, Reading, Penn.

**National Exposition of Chemical Industries** will hold its fifth annual meeting at the Coliseum and First Regiment Armory, Chicago, Ill., during the week of Sept. 22. Manager, Charles F. Roth, 417 South Dearborn St., Chicago, Ill.

**The National Safety Council** will hold its annual meeting Oct. 1 to 4 at Cleveland, Ohio. Secretary, S. J. Williams, Chicago, Ill.

## Recent Coal and Coke Patents

**Ventilating Apparatus for Mines.** D. F. Lepley, Connellsville, Penn., 1,297,191, Mar. 11, 1919. Filed Sept. 19, 1917. Serial No. 192,164.

**Furnace Grate.** W. M. Duncan, Alton, Ill., 1,297,116. Mar. 11, 1919. Filed Dec. 10, 1918. Serial No. 266,120.

**Sectional Coal Auger Nut.** J. H. Mason, Duncan Falls, Ohio, 1,297,215. Mar. 11, 1919. Filed July 22, 1918. Serial No. 246,251.

## Trade Catalogs

**Crushing Rolls.** Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin No. 1816. Pp. 16; 8 x 10½ in.; illustrated. Rolls of various designs are illustrated and briefly described.

**Storage Battery Locomotives.** The Ironton Engine Co., Ironton, Ohio. Folder including letter. Pp. 4; 8½ x 11 in.; illustrated. Facts and illustrations of industrial storage battery locomotives—also charging outfit.

**Direct Current Motors and Generators.** Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin No. 1096-A. Pp. 20; 8 x 10½ in.; illustrated. Gives details of types "K" and "KC" motors and generators and notes their application in industries.

**Stationary and Portable Air Compressor Equipments.** Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin No. 1105. Pp. 7; 8 x 10½ in.; illustrated. General description given of electrically driven air compressors and accessories and equipment.

**Direct Current Generating Sets.** Engberg's Electric and Mechanical Works, St. Joseph, Mich. Catalogue No. 103. Pp. 32; 8½ x 11 in.; illustrated. Descriptions of engines and other parts of electric generators and accessories; working drawings given; applications of the generating sets illustrated.

**Wilmot Complete Repair Parts.** Wilmot Engineering Co., Hazleton, Penn. Catalogue. Pp. 118; 7 x 10 in.; illustrated. Notes particulars about all the necessary parts applicable to the various types of machines and equipment built by the Wilmot company. Numerous illustrations and full instructions specify information required in ordering material or equipment.

## Industrial News

**Elkins, W. Va.**—Work has recently been completed by the Elkins Coal & Coke Co. on the complete electrification of its mines and plants in the Elkins district.

**Richwood, W. Va.**—The Elk Lick Coal Co. has recently completed the construction of a new tipple and incline at its properties here and also the installation of mining machinery.

**Grove City, Penn.**—The Atlas Coal Co., of this place, intends making improvements to its plant in the near future by installing machinery and boilers. The improvements will cost in the neighborhood of $50,000, it is stated.

**Roanoke, Va.**—At a recent meeting of the board of directors of the Pocahontas Coal and Coke Co., Thomas Reath was elected assistant general counsel of the company, with an office in the Commercial Trust Building, Philadelphia, Penn. The secretary of this compay is O. Lynn Bottomley.

**Wilkinsburg, Penn.**—Frederick & Co. has recently completed negotiations for the purchase of 1200 acres of coal properties in the vicinity of Farmington, W. Va., and it is understood that the company is arranging to commence work at an early date for extensive development. Fred A. Sesler is president.

**Whitesburg, Ky.**—It is reported that the McKinney Steel Co., operating at Wolf Pit, is planning to install a large power plant in connection with development of about 40,000 acres of coal land. The company also expects to erect several hundred modern miners' houses, and develop on a big scale.

**Baltimore, Md.**—The Peerless Coal Mining Co., Munsey Building, of this place, is understood to be arranging plans for the development of coal properties comprising about 4000 acres located in the vicinity of Red Rock, W. Va. It is expected to have an ultimate output of about 2000 tons daily.

**Pittsburgh, Penn.**—The Edison Storage Battery Co. announces the removal of its district office here to Room 431 Union Arcade Bldg. The removal has been made necessary by the increase in the volume of business handled through this office. The new location provides better facilities and has large office space.

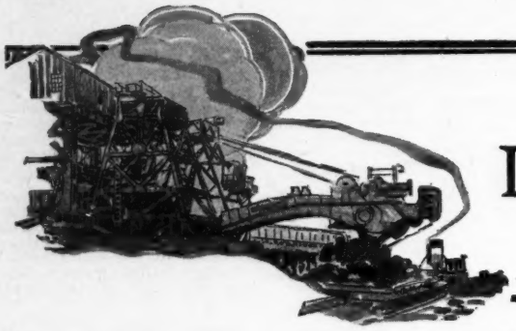
**Henlawson, W. Va.**—The Merrill Coal Mines, Inc., is the title of a $600,000 corporation organized here for the purpose of developing 3800 acres of coal lands in Logan County.

The improvements are to include a tipple to cost $70,000. Five hundred miners will be employed, and a town to accommodate that number will be erected. L. B. Conway of Roanoke, Va., is president of the company: C. W. Jones of Cora, W. Va., vice president and General manager, and C. G. Holland, of Roanoke, secretary and treasurer.

**New York, N. Y.**—The New York Steel Exchange, Inc., controlled by Mark R. Lamb, is having plans prepared for two coal plants in the Lens district of France. These plans are under the supervision of the Wood Equipment Co., and the Allen & Garcia Co., both of Chicago. The proposed equipment includes a revolving car unloader, skip hoist and modern efficient labor saving devices. The merger of Mr. Lamb's export business in mining and other heavy machinery with the export business in iron and steel products, provides facilities for handling the two groups of clients.

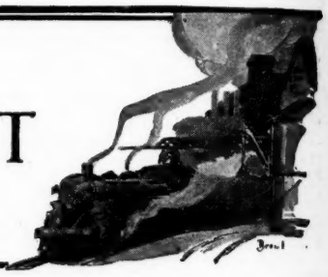
**Reading, Penn.**—Announcement has been made by the Pennsylvania Retail Coal Merchants' Association that the fifteenth annual convention of the organization will be held at this place on July 23-25, inclusive, with headquarters at the Hotel Berkshire. It is interesting to note that this will be the first annual meeting of the association since 1914, and it is expected that a very instructive program will be followed through. In connection with the meeting, the arrangement committee is planning to present an exhibition of the latest equipment in coal handling machinery, supplies, etc., at which a number of the leading manufacturers of these specialties will take an active part.

**New York, N. Y.**—W. H. Truesdale, president of the Lackawanna R.R., devotes considerable space in his report for the year ended Dec. 31, 1918, to the activities of the coal properties of the company, saying that the mining operations were somewhat reduced, owing in great part to the scarcity of labor, many of the mine employees either having been called into active war service or secured employment in munition factories, shipyards or Government work of other kinds, owing to the high wages paid. He says that although the wages of all mine employees were substantially advanced on two occasions, and that the prices of coal to the public was increased, these price increases did not prove sufficient to reimburse the mining companies for the wage increases plus the high cost of materials used in mining operations.



# MARKET DEPARTMENT

EDITED BY ALEX MOSS



## *Weekly Review*

*Soft Coal Market Tightening, with Prices Going Higher—Production Far Behind Last Year —Anthracite as Short as Ever—Steam Coals Moving Well—Output of Domestic Sizes Not Equal to Demand*

AN INCREASE in the demand for bituminous coal was felt along the Atlantic Seaboard, and as a consequence the price of the quality grades has gone up. Operators and shippers were expecting the spurt, but labor shortage and inadequate car equipment militated against any record outputs being made. For the week ended July 5 (the latest statistics available) the production of soft coal amounted to 7,469,000 net tons. The output of the bituminous coal mines for the calendar year to date totals 220,361,000 net tons, or nearly 74,500,000 net tons less than than in the corresponding period last year.

Coal not under contract was eagerly sought at the various tidewater ports. The demand for New River and Pocahontas coals was even more urgent than formerly, and quotations for the former were given for twenty-four hours only and at around $6.25 at Hampton Roads for the standard used by the Navy Department.

From Pittsburgh comes the report that much uneasiness is being felt that production will not be sufficient to meet industrial requirements in that region.

As the season advances, the domestic sizes of anthracite are becoming more scarce. It is unlikely that this condition will better itself, as the lack of labor at the mines and the deficit in the production of hard coal are handicaps that it will be impossible to overcome. For the week ended July 5, the anthracite output was 1,408,000 net tons, making the total production to date 40,204,000 net tons, or 10,600,000 net tons less than in the corresponding period last year.

Finding it difficult to obtain the egg and stove sizes of hard coal, consumers are accepting either chestnut or pea in lieu thereof, and this is serving to relieve the situation somewhat.

Steam coals, too, are not so easy to obtain as they were a week or so ago. Buckwheat is readily absorbed by the trade, and rice and barley are firmer, owing to a decrease in production at the washeries.

### WEEKLY COAL PRODUCTION

The production of bituminous coal in the week ended July 5 is estimated at 7,469,000 net tons, an average per day for the five working days of 1,494,000 tons, compared with an average per day of 1,576,000 tons in the previous week, as against 2,050,000 tons in the week ended July 6, 1918. The production for the calendar year to date was 220,361,000 tons, nearly 74,500,000 tons less than in the corresponding period last year. The average daily production, considering only working days, has been about 500,000 tons less this year than last year.

The estimated production of anthracite in the week ended July 5 was 1,408,000 net tons, compared with 1,735,000 tons in the corresponding week last year. The average daily production in the week ended July 5 (a 5-day week) was 282,000 tons, compared with 307,000 tons in the previous week and 347,000 tons in the corresponding week last year. The production of anthracite to date is estimated at 40,204,000 tons, or 10,600,000 tons less than in the corresponding period last year.

Returns from the operators for the week ended June 28 record a general improvement in market conditions, the loss of time on account of no market averaging 29.2 per cent. of full time in the week, compared with 29.3 per cent. in the week ended June 21, and more than 32 per cent. in the first half of June. Market conditions in Illinois and western Kentucky recorded a notable improvement. Less than 4 per cent. of the full-time operation was lost because of no market in western Pennsylvania, less than 9 per cent. in the Westmoreland and neighboring fields. Central Pennsylvania showed an improvement. Car supply in southwestern Virginia was better in the week ended June 28 than in the previous week, but in several of the other districts, including northern Ohio, Pennsylvania, northern West Virginia and eastern Kentucky, slightly greater losses of time were reported because of the lack of cars.

The production of beehive coke in the week ended July 5 is estimated at 262,410 net tons, compared with 579,000 tons in the week ended July 6, 1918, and with 283,600 tons in the last week of June, 1919. The production in the week ended July 5 was curtailed because of the celebration of the holiday on July 4.

Bituminous coal dumped at lower Lake Erie ports in the week ended June 28 was 994,901 net tons, compared with 1,058,273 tons in the week ended June 21 and 900,000 tons in the last week of June, 1918. The total lake coal dumped to the end of June of this year was 9,129,502 tons, compared with 7,699,423 tons in the corresponding period last year.

### BUSINESS OPINIONS

**Dry Goods Economist**—The movement of dry goods over the counter continues to be steady throughout the country, and, in consequence, stocks of many lines of goods are becoming depleted. Due to the semi-annual stocktaking which will occur in most stores the last of this month, there has been the usual falling off of orders for many lines of goods.

**Marshall Field & Co.**—Current wholesale distribution of dry goods ran considerably ahead of the large volume of the corresponding week a year ago. More merchants were in the market than during the same week of 1918. All report retail business as excellent. Orders from road salesmen for both immediate and future delivery were very much greater than for the comparative period of last year. Collections continue satisfactory.

**The Iron Age**—Improvement in the steel situation is asserted in stronger terms this week. Mill schedules show it, particularly in the Central West. In a number of finished lines bookings are large and the opinion has been ventured that May output will stand as the low record of the year. Steel ingot production fell last month to an average of 85,000 tons a day, against 102,500 tons in April, a decrease of 17 per cent. The May rate represents about 26,000,000 tons a year, or about 55 per cent. of the country's capacity.

**American Wool and Cotton Reporter**—Wool is being held at very firm prices. Higher prices are being asked for wools in the West, although in some localities the clip is cleaned up. The demand for raw cotton may not appear exceptionally large but the supply is not so large as published figures indicate. The prospective demand from other countries or increased exports has not been discounted at all. The higher price for cotton is due to general inflation and to higher producing costs in combination with the ability of holders to keep their cotton.

## Atlantic Seaboard

### BOSTON

**Appreciable hardening of prices on better grades. Light output causes renewed buying interest. Inferior grades dull, but gas coals are being rapidly sold up. Possible strike of marine workers a factor in water coal. Hampton Roads coals subject to slow loading. Future of market in this territory in doubt, due to uncertain requirements the next six months. Holiday interval leaves loading piers almost bare of anthracite. Shipments of pea urged.**

**Bituminous**—The quality grades are noticeably firmer in price. Grades that were selling at $2.95 a fortnight ago are now commanding more than $3 for spot shipment. While there is no great pressure to get these coals forward, it is easy to see that the demand is improved. Those steam users who have ordinarily taken coal via water routes and this season made it a practice to test different grades all-rail have now had it forced on their attention that the tonnage of desirable coals available is much less than they supposed, and that for the balance of the season they will be obliged to take what they can manage to pick up from one region or another. It develops that a number of operators in making season contracts reckoned on much larger output than now seems possible, and the extent to which mine-workers have left certain of the districts is little short of alarming. It will take more than advanced prices to bring them back, as the situation looks now.

Extremely light shipments since July 1 have reminded buyers that they must be forehanded in taking on coal. There has been renewed buying on that account the past week, and should this continue there would doubtless be a further stiffening of prices for prompt shipment. Already there are operators who are charging 20c. advance for deliveries after July 31, and this reflects the present state of the all-rail market in New England. Only small ton-

nages are involved in present sales and reserves are still abnormally large, but there can be no question of a much more wholesome situation from the operator's standpoint than has prevailed for many months.

On the other hand, the inferior grades still meet with hard going. Coals from the Fairmont region, limited as they are by the tariffs to certain parts of this territory, are still being pressed upon unwilling buyers. Prices are unchanged on these grades, and efforts to contract meet with little response because deliveries from that section have usually proved undependable when railroad conditions were unfavorable. Already there are indications of large numbers of crippled cars being stored on various sidings, and in July this is hardly a good sign.

The better grades of gas coal have met with much better sale the past fortnight than during any similar period earlier in the year. The new impetus given the iron and steel industry is largely responsible, and not only are screened coals in better demand, but run of mine and slack are already commanding better prices. This is particularly true of the Greensburg district, where operations are now apparently well supplied with orders and output is as great as the labor supply will permit.

Coastwise trade has been upset the past week by the threatened strike of 40,000 marine workers. This was to be effective July 15, and steamers and tugs have been enabled to leave port the last few days only through promises on the part of owners that their wages will be adjusted. At this writing it is rumored that through intervention of the Shipping Board an increase of 10 per cent has been granted along with an eight-hour day while in port and preferential employment of American workers. A tie-up of coast-wise shipping would be serious in its effect on coal alone, for there are several distant markets in South America and overseas that are practically dependent upon current deliveries.

Steamers at Hampton Roads have been meeting with slow dispatch now for two or three weeks. Coal has come down in irregular volume and it has become increasingly difficult for the agencies to plan shipments. Current sales of Pocahontas and New River at this end are now being made at stated prices f.o.b. cars plus steamer demurrage. In some cases the latter item has amounted to 40c., and this is another reason for the improved demand for Pennsylvania coals all-rail. Receipts from Hampton Roads are still relatively light and are confined largely to consumers who take their supply at tidewater points. Spot coal at the piers is hard to get, but no material advance in price has yet been reported.

The outlook for September is favorable to a better market in this territory, but there is still some doubt whether we shall have the broad market which has been so freely predicted. Strange as it may seem, there is no apparent anxiety on the part of steam-users through New England, due partly to heavier reserves than used to be customary and also to the uncertainty what requirements are to be the next half year. Manufacturers are basing their probable needs on an output somewhat greater than present business would warrant, but there is not yet in sight the large orders that were expected.

Current quotations on bituminous at wholesale range about as follows:

| | Clearfields | Cambrias and Somersets |
|---|---|---|
| F.o.b. mines, net tons | $2.15@2.75 | $3.00@3.40 |
| F.o.b. Philadelphia, gross tons | 4.27@4.95 | 5.20@5.55 |
| F.o.b. New York, gross tons | 4.62@5.29 | 5.55@6.00 |
| Alongside Boston (water coal), gross tons | 6.10@6.85 | 7.00@7.50 |

Georges Creek is still quoted at $3.70 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $5.14@5.35 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $7.32@7.60, and on cars Boston and Providence at from $7.50@7.90 per gross ton.

**Anthracite**—Output was seriously let down during the July 4 celebration and as a result domestic sizes have been in extremely short supply at the Philadelphia and New York piers. Barges have been waiting ten days to two weeks for egg and stove, and at Philadelphia bottoms that were scheduled to load anthracite have been turned over to shippers of bituminous. All-rail shipments have been similarly disappointing and retail dealers especially in the larger towns and cities are much exercised at the slowness with which coal comes forward. This territory is flooded with circulars from various independent operators who on paper have offered their egg and stove at premiums as high as $1.25, but when favored with spot orders they seem quite as slow making shipments as the companies at circular prices.

Pea has been in long supply all season but only within a few days have retail dealers shown any disposition to take on straight cargoes of this size. The extreme shortage of the major sizes, however, has encouraged this to some extent and it is quite likely that a large tonnage of pea and buckwheat will be moved this month.

## NEW YORK

**Dealers are hard pressed for domestic coals, which are becoming scarcer. Demand from Canada and New England increases and quick deliveries are urged. Anthracite steam coals not so plentiful, with prices easy. Market for bituminous in better shape. Demand increases followed by slight advances in prices for various grades. Export and bunker business hit by shipping tie-up.**

**Anthracite**—The trade continues to be pushed for the domestic coals, which appear to be getting tighter as the season advances. There is nothing ahead that would indicate a betterment of conditions outside of a heavy increase in production, and that is unlikely when one considers the present deficit in this year's tonnage figures and the lack of labor at the mines.

Local retail dealers are heavily booked with orders, and instead of having an easy summer season, as was the case a couple of years back, they are prepared for hard work. There is hardly a customer who does not want his coal "at once," notwithstanding that there may be many orders ahead of his. Because of this urgency and his inability to get as much of the domestic coals as he can use, the retailer has his own troubles trying to please everybody.

The situation regarding egg and stove sizes has not changed materially. These coals are hard to get from the producers, and as this is well known to consumers the dealers are not having so much difficulty as formerly in substituting either chestnut or pea size. This concession on the part of the consumer has served to reduce the supply of chestnut and pea at the docks.

Independent coals are much in demand, and while much is heard of premiums being offered for quick shipments, especially to Canada and New England, nothing has been heard that would indicate that anything more than $1 has been offered for coal to be sent to Canada. New England dealers are in the market for all of the domestic coals they can get. They claim to be far behind in stocks and are anxious to fill their bins before transportation difficulties set in.

The steam coals are in better shape. Buckwheat is not so free as it was a week or ten days ago, and more of it is being absorbed by the trade, especially when it is possible to secure either of the larger sizes with it. Rice and barley are firmer, due to lessened production of the washeries. There has been practically no change in quotations, a good grade of barley being quoted around $1 at the mines.

Dealers are interested in the shipments of anthracite last month, which showed a decrease of 92,324 tons as compared with May, the larger part of this decrease being attributed to the smaller output of steam coals from the washeries.

There were 4908 cars of anthracite dumped at the railroad piers here during the week ended July 11 as compared with 5485 cars the previous week. The reports also show 2809 cars on hand as compared with 2773 cars on July 4.

Current quotations, white ash, per gross ton at the mines and f.o.b. at tidewater, at the lower ports, according to company schedule, are as follows:

| | Mine | Tidewater |
|---|---|---|
| Broken | $5.95 | $7.80 |
| Egg | 6.15 | 8.00 |
| Stove | 6.40 | 8.25 |
| Chestnut | 6.50 | 8.35 |
| Pea | 5.10 | 6.85 |
| Buckwheat | 3.40 | 5.15 |
| Rice | 2.75 | 4.50 |
| Barley | 2.25 | 4.00 |

**Bituminous**—The bituminous market is in better shape and the prospects are bright. Demand has increased and prices have stiffened slightly. But, on the other hand, is the threatened marine strike which may tie up much of the coastwise shipping and may menace transatlantic transportation. Such a tie-up would cause a serious loss to producers of bunker and export coals.

Producers and shippers for the most part have been optimistic for some time and were prepared for the spurt that developed during the past ten days. Free coals at the various tidewater ports were eagerly sought, and within a few days most of it had been picked up at prices slightly higher than those that prevailed for a couple of weeks back. While some of the buying no doubt was the result of the advertising campaign instituted by coal associations, more of it was due to reduced stocks in the bins of manufacturers, who have been entering the market in greater numbers the past few weeks. These heavy buyers now realize that if they want to be protected this fall and winter from the lack of coal they must begin now to replenish their bins. Contract holders are receiving their full allotment of coal.

The increase in demand was not confined to this market alone, but was spread over almost the entire eastern section of the country. Reports from along the railroads show a heavy call for coal and a slight increase in mine prices.

Operations failed to respond generally to the extra call. In addition to the slowness of labor the trade is now confronted with a slackened car supply besides poor equipment. Warnings have been given many times this spring that cars would be short this fall because of the heavy demands of the steel industry and the need of cars to move grains, but it was not expected that this demand would set in until later.

Supplies here are considerably smaller than they were a week ago, but there is no trouble to make shipments promptly. Some of the pools are almost clear of free coals.

There is a heavy demand for New River and Pocahontas coals. Quotations for the former are given for 24 hours only and are around $6.25 for Navy Standard at Hampton Roads. From Pittsburgh comes word of much uneasiness because of the fear that production will not be able to take care of the requirements of the industries. Youghiogheny gas coal of good quality was quoted early in the week around the $3 mark. Smokeless coals were moving rapidly.

Quotations for the various pool coals f.o.b. piers here ranged about as follows:

Nos. 1 and 71, $5.50 to $5.65; No. 9, $5.30 to $5.60; No. 10, $5.00 to $5.25; No. 11, $4.75 to $5.00; and No. 18, $4.35 to $4.50.

The range of prices for spot coals at the mines ranged about as follows:

| | |
|---|---|
| South Forks (Best) | $2.95@3.25 |
| Cambria (Best) | 2.75@2.95 |
| Cambria (Ordinary) | 2.45@2.60 |
| Clearfield (Best) | 2.75@2.95 |
| Clearfield (Ordinary) | 2.45@2.60 |
| Reynoldsville | 2.50@2.75 |
| Quemahoning | 2.75@2.95 |
| Somerset (Best) | 2.75@2.95 |
| Somerset (Poor) | 2.15@2.35 |
| Western Maryland | 2.25@2.50 |
| Fairmont | 1.90@2.25 |
| Latrobe | 2.10@2.25 |
| Greensburg | 2.35@2.50 |
| Westmoreland ¾ in. | 2.60@2.75 |
| Westmoreland run-of-mine | 2.35@2.50 |

## PHILADELPHIA

**Anthracite retail trade held back by light shipments. Premiums in other markets hurt local trade. All dealers want stove; chestnut and egg in strong demand, but pea plentiful and inclined to dragginess. Production fair. New ordering is light. Advertising and rumor of freight change cause some new business. Retail prices grow firm. Steam coals off, and storage increases. Bituminous high grades scarcer. Good business in other grades. Prices firm.**

**Anthracite**—With plenty of orders on their books the local retailers are making little progress with deliveries. The shipments recently have been much below what they should have been to enable the dealers to do a really profitable business. Many times lately teams and men have been idle on account of the lack of certain sizes of coal. When the dealers complain to the shippers they have pointed out to them that even the tonnage they have received thus far this summer is much in excess of what they received in a similar period in pre-war times. The shippers do not deny that heavy shipments are going to western and New England markets, and on the part of the company shippers they point out that this has always been more or less a custom. As a matter of fact the shipments from Port Richmond via barge for eastern points has been quite heavy of late and will no doubt continue all summer.

The dealers are also annoyed by the reports of heavy premiums being paid in other markets. This they feel acts to the disadvantage of the local trade. It is known that local shipping offices have received offers of premiums running from 50c to $1 per ton over the announced July

prices of the individual houses. Even the South has lately come into the market willing to pay excess prices. It is felt in some quarters that this coal is not being delivered immediately, but is being stored for delivery later. It is certain that no appreciable amount of premium coal is being sold in this city, the only instances being in cases where dealers have been desirous of satisfying some choice trade and have been anxious to complete delivery.

As has been the case for weeks, the big demand is for stove coal and of the hundreds of customers who make personal calls at the offices of the mining companies they without exception ask for stove. Chestnut is also scarce and not growing much easier, but many local dealers have managed to keep a fair supply on hand. Egg has not as yet put in its appearance, and while the new orders for this size are rather light, nearly every dealer has a larger tonnage than usual on his books awaiting delivery. Pea coal is plentiful and if anything more so than at any time this summer. Some of the big companies have actually instructed their salesmen to make efforts to place heavier tonnage of this size. It is just barely possible that pea will be a little draggy for the balance of the month, but there is one thing that may help out the situation and prevent it from becoming actually troublesome, and that is, the dealers being short of the other domestic sizes are using the opportunity to urge their customers to take a fair tonnage of this size, and it is believed quite a little has been placed in this way. Thus far all the heaviness in pea has been confined to the larger companies, as the independents claim to be able to place all of their tonnage without price concessions.

Recently a rumor has gone broadcast that an increase in freight rates might be ordered before the first of the year. This seems to be based on more than mere rumor, for while the railroad authorities have all along been averse to another increase, the report is that the deficit of the railroads is such that an increase cannot be avoided. By some this accounts for the heavy premiums which are being offered by dealers in outside territories, who hope to be able to recoup part of the extra expenditure by getting the coal in at the lower freight rate. One thing is certain, the consumers cannot expect to receive any reduction in coal, for the trend is in just the opposite direction and it is believed that they have for the most part been convinced of this.

All of the above is reflected in the retail price situation, which shows signs of strengthening. The firm which has always led in price cutting is now asking $10.35 for egg, $10.60 for stove and nut, and $9 for pea coal. The improvement can readily be noted when these figures are compared with the prices of one of the largest dealers in the city, as follows: Egg $10.65, stove $10.85, nut $10.95, and pea $9.30.

This week the larger companies seemed to have more buckwheat than ever to offer and the quantity going to storage has considerably increased. When it is picked up the coming winter it is more than likely that the cost of storage will be added to it, as the companies have more than once intimated. There is no question that the coal will be in demand and it will be cleaned up long before spring arrives. The smaller sizes have also lately gone into the yards in increasing volume, but with the month close to half gone it is felt that all industrial plants will call for increased quantities for storage at their plants.

**Bituminous**—The only noticeable change in the soft coal situation is the growing tendency of the high-grade coals to become harder to get. It is believed that in order to meet this situation the operations are making better working time. While shippers show an inclination to book orders for such coals, practically none of them is willing to take on any heavy business at a price. The one result of this has been to create a better demand for the ordinary coals and some good spot business is being reported in those grades. The possibility of a freight increase has also stirred some interests to the point of endeavoring to increase stocks, but this is by no means general, as the tendency as yet is simply to drift along and buy as the coal is required.

There has been little price fluctuation and quotations are fairly firm within the following range, f.o.b. mine:

| | |
|---|---|
| Georges Creek Big Vein | $2.95 @ $3.05 |
| South Fork Miller Vein | 2.95 @ 3.05 |
| Clearfield (ordinary) | 2.60 @ 2.75 |
| Somerset (ordinary) | 2.50 @ 2.65 |
| Fairmont lump | 2.50 @ 2.60 |
| Fairmont mine-run | 2.35 @ 2.50 |
| Fairmont slack | 1.90 @ 2.05 |
| Fairmont lump (ordinary) | 2.25 @ 2.35 |
| Fairmont mine-run (ordinary) | 2.00 @ 2.15 |
| Fairmont slack (ordinary) | 1.65 @ 1.75 |

### BALTIMORE

**Change in the bituminous situation is small. Prices continue firmer for domestic grades and the export trade is still the real business at this port. The supply of high-grade coals is fast diminishing and the demand of the domestic buyers grows stronger, sending prices up. For domestic use the price remains strong around $2.75, while foreign buyers have been paying in the neighborhood of $3 for the best grade of fuels.**

Exports during the first part of July reached 44,105 tons cargo and 3,950 tons of bunker coal. These figures furnished by the custom house officials are for but three days, July 1, 2, and 3, on which days 10 vessels left port. The cargoes were destined, two each going to Holland, Cuba, Sweden and Switzerland, and one each to Norway and Italy.

Shippers continue to be bothered somewhat in obtaining bottoms from the United States Shipping Board. They obtained allocation of tonnage, but there is always a certain indefiniteness about just when the bottoms will be ready for use. On the other hand, bottoms obtained from private sources are always ready on time.

Notice was given by the Pennsylvania R.R. to all shippers using its lines that coals consigned to this port for foreign shipment must be loaded from the Canton pier of the company and not sent to the B. & O. pier at Curtis Bay. During the war the railroad administration closed the western Maryland piers at Port Covington to foreign service and all exporting of coal was made from Curtis Bay piers, while the Canton pier was used exclusively for harbor lighterage business. The order did not meet with general approval, for shippers say the Canton pier, while modern in every particular, is not as well operated as the Curtis Bay pier.

Light anthracite shipments continue to cause dissatisfaction among the dealers in general. The increase of the retail prices did not cause any let-up in buying, but added to the undelivered business already on file. Premium rates continue to go up and as high as 75 cents per ton were quoted. Some small dealers, probably for the first time in the memory of local dealers, paid premiums for anthracite in order to handle their business.

## Lake Markets

### PITTSBURGH

**Market strength continues. Contracts not popular with operators. Production at 60 or 65 per cent. of full capacity.**

The Pittsburgh district coal market continues to reflect the stronger undertone noted a week ago, some operators being quite averse to selling at $2.35 even for early deliveries, while there is not much disposition on the part of any operators to accept contracts for delivery to Apr. 1. Some grades of steam coal continue to be available at $2.25 and occasionally odd lots go at lower prices still. The differential between gas and steam coal is very narrow as compared with the market of early in the year. By far the largest differential is in the case of slack, in which it is about 40c., but this is a fortuitous circumstance due simply to the fact that the lake movement of ¾-in. is almost wholly in steam coal at present, thus causing heavy production of steam slack as compared with gas slack.

Labor conditions are about the same as formerly. There is still much talk of foreign-born miners and common laborers, particularly the latter, going back to the countries of their birth, but in some quarters the suspicion is growing that this prospective movement has been greatly exaggerated. Coal production in the district as a whole is at about 60 or 65 per cent. of full capacity; while calling capacity merely the full-time tonnage that could be gotten out with the present sized payrolls, the output is about 75 per cent.

We quote the market unchanged from a week ago as follows: Steam slack, $1.30@1.40; gas slack, $1.70@1.80; steam mine-run, $2.25@2.50; gas mine-run, $2.35@2.50; ¾-in. gas, $2.60@2.75 per net ton at mine, Pittsburgh district. There is no movement in domestic coal and no definite market exists.

### BUFFALO

**Bituminous improving slowly. No great rush to buy yet. Prospect of increase till volume is good. Everybody confident. Anthracite active as ever. Lake shipments good.**

**Bituminous**—The trade is in a much more healthy condition than it was. All prices, unless it be for slack, are strong, and this will soon be influenced by the condition of sizes. Nobody expects slack to be firm in summer, unless the general demand is rushing, so it does not affect conditions much. Steady improvement is looked for right along.

At the same time the amount of business is not yet large in this market. The Pittsburgh shippers thought they saw the stir coming and announced that it had arrived, thus being able to boost the market before the conditions were quite ready therefor, possibly helping the trade, possibly not. Buffalo was more conservative and waited till the real improvement was here. Consumers are not buying as freely as could be wished, but are mostly in the market in some way. They are still trying to contract at going figures, but shippers usually decline their offers.

There is every prospect of a steadily improving trade. Other industries are active. Iron is in better demand and the furnaces must have fuel. There is much less bituminous in consumers' hands than there has been, the war tangles are slowly straightening out. Only labor and the consequent high cost of living go adversely.

If the condition of slack should improve materially the whole bituminous trade would be strong. Prices continue at $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh, and No. 8 lump, $4.65 for same three-quarter, $4.20 for mine run and $3.65 for all slack, with $5.25 for Cambria County smithing and smokeless, all per net ton, f.o.b. Buffalo.

**Anthracite**—The trade is without much change. The demand exceeds the supply and this promises to continue. What it will be when the regular time comes for laying in the great part of the winter supply depends on the summer mining, which has not been satisfactory so far. There is much complaint that the miners are not working steadily and that they are going back to Europe at a considerable rate. The much-feared demands for higher wages have so far not developed and war wages still prevail.

Shipments by Lake continue good, the amount for the week being 107,100 net tons, of which 38,100 tons cleared for Chicago, 28,000 tons for Fort William, 16,000 tons for Duluth and Superior, 12,800 tons for the Canadian Sault, 8,100 tons for Milwaukee, 3,000 tons for Houghton, and 2,800 tons for Marquette.

Freight rates continue easy at 60 cents to Chicago, 50 cents to the Sault, 47½ cents to Milwaukee, 42½ cents to Duluth, Fort William, Port Arthur, Houghton, Marquette.

The anthracite quotations for July advanced 10 cents a ton except on grate and buckwheat. Prices now rule as follows:

| | F.o.b. Cars, Gross Ton | At Curb, Net Ton |
|---|---|---|
| Grate | $8 55 | $10 20 |
| Egg | 8 75 | 10.50 |
| Stove | 9 00 | 10 70 |
| Chestnut | 9.10 | 10 80 |
| Pea | 7 30 | 9.15 |
| Buckwheat | 5 70 | 7.75 |

### CLEVELAND

**Demand for all grades of coal is slowly but steadily increasing, and prices are stiffening accordingly. The shortage of anthracite and Pocahontas borders on the acute.**

**Bituminous**—Steam coal users continue increasing their buying. Southern and eastern Ohio mines now are being operated at about 75 per cent of full-time capacity, an increase of from 10 to 15 per cent. in most instances, and northern Ohio buyers are absorbing this increase. In addition, coal moving to the Lake decreased somewhat owing to the holidays, a temporary shortage of cargo space, due to freighters being bunched at the Upper Lake ports, and a three-day embargo at one of the big shipping points on Lake Erie on account of car congestion. While no trouble is encountered in placing coal, yet the supply on the local market is not excessive. All that is coming in is being placed. Prices are somewhat firmer, though no marked advance in either steam coal or slack is noted. In slack, the range continues quite wide, from $1.30 to $2.10.

Counting out the Fourth of July holiday, labor conditions at the mine show much improvement. Prospects of continued steady work have drawn back many workers who left. But car supply still is a source of much trouble. Reports that the Railroad Administration will take over and put into use the coal cars the carriers are refusing to accept because of their high cost are warmly received by Ohio

operators. Now that workers can put in a full day much less talk of difficulty over a new wage scale is heard.

**Anthracite and Pocahontas**—It may be safely said that for every ton of anthracite and Pocahontas local retailers are able to deliver they could place two. Some operators are even making personal trips to the West Virginia fields in order to obtain increased shipments. Prices have advanced on both Pocahontas and anthracite, dealers who had been holding back the 10-cents-a-month increase putting the entire burden on the consumer.

**Lake Trade**—Shipments of bituminous coal from Lake Erie ports in the last week of June totaled 1,010,957 tons, including vessel fuel, making the season's shipments to July 1 9,144,600 tons, compared with 7,650,000 tons up to July 1 last year. Where last season shipments did not really begin until July 1, it is believed shipments this season will not show any great gain from now on, owing to the big grain and iron ore movement later in the season. The first week in July will show shipments not much more than 750,000 tons, because of the holiday, it is feared.

Prices of coal per net ton delivered in Cleveland are:

| | |
|---|---|
| Anthracite: | |
| Egg | $11.15 |
| Chestnut | 11.65 |
| Grate | 11.45 |
| Stove | 11.55 |
| Pocahontas: | |
| Forked | 9.50 |
| Lump | 8.75 |
| Mine-run | 7.50 |
| Domestic bituminous: | |
| West Virginia splint | $7.75@8.00 |
| No. 8 Pittsburgh | 6.25@6.60 |
| Massillon lump | 7.50@7.60 |
| Steam coal: | |
| No. 6 slack | 4.20@4.40 |
| No. 8 slack | 4.70@5.00 |
| Youghiogheny slack | 4.85@5.15 |
| No. 8 ¾-in. lump | 5.40@5.55 |
| No. 6 mine-run | 4.50@4.60 |
| No. 8 mine-run | 4.90@5.05 |

### DETROIT

**Sales of bituminous coal fall short of the business usual at this season in Detroit, with buyers holding back.**

**Bituminous**—Consumers of steam coal have not yet decided that the time for stocking up has arrived. Few of them are buying to any extent. Their procrastination occasions much uneasiness among jobbers and wholesalers, whose study of market conditions discloses a situation that, they say, is far from reassuring. Through members of the trade and Detroit's Board of Commerce, warning has been given the coal users that immediate action is imperative to assure obtaining coal in sufficient quantity to meet winter requirements. Still, a large number of the leading consumers of steam coal are holding back, seemingly exerting no effort to protect their interests. Coal is not being brought into Detroit in the quantity that should be coming at this time of the year, jobbers say, if adequate reserves are to be provided.

In the case of some of the buyers, it is pointed out that the reason for delay is found in the desire to free storage yards of the stock of inferior quality that was bought a year ago. The jobbers feel, however, that in following this course, consumers are assuming a risk that is likely to prove costly later. Some difficulties and delays in making shipments already have been reported as due to scarcity of suitable cars at various production centers. That the car shortage will increase as the season advances is certain, the jobbers assert.

Domestic lump from the Hocking district is quoted at $2.75 for net ton, f.o.b. mines. Mine run from Ohio is offered at $2, and slack is held at $1.50, though sales have been reported at a lower price. Gas or splint lump is selling around $3 to $3.25; 2-in lump from West Virginia at $2.75, mine run at about $2.10 to $2.15, and slack at $1.85 to $1.90. Smokeless coal is hard to find, and mine run is reported selling around $2.75 to $3, with freight charges and federal tax to be added.

**Anthracite**—Considering the trials and difficulties experienced by household consumers during the last two winters, the volume of business in anthracite is surprisingly light. Jobbers say stocks in possession of retailers would be exhausted speedily with anything like a broad general demand, and that their renewal likely would involve considerable delay.

### COLUMBUS

**More activity is developing in both steam and domestic grades. Householders are buying better, although many are still holding back. Steam buyers are now in the market as reserve stocks are generally depleted.**

The domestic trade is now attracting more attention, although business is not yet up to the usual volume for the time of year. Retailers report a better run of orders, some of which are for immediate delivery. Retailers are also booking orders for delivery later in the season at the price prevailing at that time. There is a good demand for Pocahontas anl West Virginia splints. Semi-smokeless grades are also moving fairly well. Retail stocks are only fair and there is still considerable storage space to fill. Hocking lump is not being stored to any extent and the same is true of Pomeroy Bend grades. The uncertainty as to houses and the likelihood of dwellings being leased over the heads of present occupants has the effect of causing householders to hold off on their winter's fuel.

The steam trade is also showing up better and the volume of business is slightly increased. Reserve stocks are pretty well exhausted and as a result quite a few large consumers are in the market. Iron and steel plants are buying better and quite a few have entered into contracts. Consumers are not buying off the open market as largely as formerly. General manufacturing appears to be more active and the fuel consumption is greater. Railroads are not taking any large tonnage and this is causing uneasiness among contract holders on railroad tonnage.

The Lake trade is rather active, although the holiday week showed a decrease in movement. There is still, however, quite a large tonnage to be moved to the Northwest. The docks of the upper Lake ports are not congested, as the interior movement is good. Vessels are plentiful, as the grain trade has not called boats into that service as yet.

Production is fairly good in every mining district of the state. This is especially noticeable in the eastern Ohio field where the output is estimated at 65 to 75 per cent. Pomeroy Bend is also showing up better as far as output is concerned. The Hocking Valley is producing about 65 per cent and the same is reported from Cambridge, Crooksville and Massillon.

Retail prices prevailing in Columbus are:

| | |
|---|---|
| Hocking lump | $5.50@$5.75 |
| Pocahontas | 7.50 |
| Splints | 6.00 |
| White ash | 6.50 |
| Island Creek | 6.50 |
| Pomeroy Bend | 6.00 |
| Semi-smokeless | 7.00 |
| Wheeling Creek, Kentucky | 6.75 |

### CINCINNATI

**Situation shows signs of improvement, with industrial consumers eager to sign contracts.**

Cincinnati coal users have finally come to realize that there is to be no reduction in the prices. Where several weeks ago the dealers were notifying and pleading with their large customers to contract for the year's supply, they now are refusing to enter into big contracts. Labor conditions and the transportation situation to and from the mines are not what they should be, and consequently the dealers are hesitating about entering into contracts at this time.

The situation as regards the domestic user has improved greatly. Spurred on by the advertisements of the National Coal Association and the individual appeal of the local coal men, the domestic users have been brought to see the situation in the light that it is being painted by the dealers, and as a consequence they are not sitting back, waiting for lower prices, having been fully convinced that there is to be no reduction and they do not want to take a chance of there being a shortage.

The demand from all quarters is showing a great improvement, with the lump situation strong. The market on mine-run is good. Very little lump coal is being placed by dealers. All prices remain firm.

### LOUISVILLE

**Domestic demand strong, with producers refusing much additional business without accompanying steam orders. Western Kentucky market very weak on all grades. Retailers reporting better demand.**

The operators are receiving such a strong demand for block and lump coal that many of them are refusing additional business, except where the lump orders are accompanied by orders for screenings, as the steam market is weak and it is impossible to load out screenings otherwise. Retailers are unable in some cases to secure as much lump coal as they desire, as they have not facilities for stocking or disposing of the steam coal.

There is a fair demand from the lake regions, and a slightly better general industrial demand, but stocking as a whole continues light on steam coal, and consumption apparently is below normal. Operators have been virtually giving away screenings for the last few weeks in order to move them, and have been making lump coal carry the loss.

Western Kentucky prices have been weak all along the line, owing to the fact that eastern Kentucky coal has been in good supply. Western Kentucky is not a good summer stocking coal, as it heats and fires readily. Last season western Kentucky was about the only coal available, and much dirty coal was shipped into Louisville in response to a heavy demand. The result was that with poor coal, and small knowledge of stocking, many concerns had trouble with it, resulting in a prejudice against this coal which has made it hard to sell.

Western Kentucky coal is expected to move much better by Aug. 1, when general demand should be better. Wide differentials are not helping movement materially just now, however.

There is some car shortage reported from the various mine sections of the state, while there is also a scarcity of labor in sections where mines are busy. Cars are in generally bad repair, with this condition growing worse.

### BIRMINGHAM

**Steam demand shows a slight improvement, a very good tonnage in the aggregate being covered by contracts. No change in the domestic situation. Shortage of labor and cars becoming a factor in production.**

Reports indicate a better feeling in the trade, the steam market becoming more stable under healthy basic conditions. While there is no great amount of spot business being offered, consumers are signing contracts which as a whole represent considerable tonnage, government prices ruling. Prices range from $2.75 per net ton miles for Big Seam washed mine-run to around $3.85 for washed nut and slack from the Black Creek and similar seams. The Louisville & Nashville and the Southern Railway System have not as yet contracted for fuel for the year beginning July 1, the second bids asked of operators by the latter having been submitted, but no decision has been announced as to contract awards.

There is a sharp inquiry for lump coal, the mines having contracted for about all the coal they can expect to produce under present conditions and the spot demand is brisk, prices ranging from $3.50 for medium grades of lump and nut to $5.50 for Cahaba and the like, with only a few cars to be had here and there.

Already some complaint is being heard in the coal fields of labor and car shortage, which all indications point to becoming serious factors as the season advances. Considerable labor is being taken from this section by labor agencies, and mines and ovens which are now starting up after several months of idleness are having trouble in securing the necessary forces.

## Coke

### CONNELLSVILLE

**Spot furnace coke market reverting to former level. More ovens in blast. Negotiations by idle furnaces.**

As soon as the holidays and celebrations in the Connellsville region were over the market for spot coke softened, bidding fair to get back to where it stood in the first three weeks of June, if not to a lower level. During the week of Independence Day the spot furnace coke market was firm at $4.25 as minimum, representing an advance of 25c. over the previous market. Early last week, however, a little coke began to appear on the market at $4, and while $4.25 is still quoted by a number of producers the limited demand that has developed up to date has been met in nearly all cases with $4 coke.

The foundry coke market, however, has maintained a stiffer tone and bids fair to continue on a higher basis. For many weeks the market ranged from $4.50 to $5, according to brand, the lower priced coke being of quite ordinary quality. In the past fortnight it has been only occasionally that any $4.50 coke could be secured, most makes that formerly went at $4.50 now commanding $4.75, while several choice brands that went at $5 have lately been bringing $5.25.

There is nothing particularly new in the contract situation. Almost all the furnaces in blast that use purchased coke have bought for the half year, while a few of the idle furnaces continue to negotiate for supplies on requirement contracts, shipments to depend upon whether or not the furnace chooses to run.

There has been a considerable increase in the number of ovens in blast in the past two or three weeks. Celebrations have interfered with output increasing in keeping with the increased number of ovens in blast and some doubts are entertained whether there will be ready absorption of all the coke made when operations proceed at regular rate.

The market stands quotable ae follows: Spot and prompt furnace, $4@4.25; spot and prompt foundry, $4.75@5.25; contract foundry, $5@5.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended July 5 at 130,790 tons, a decrease of 7843 tons.

**Buffalo**—The trade revives slowly. Former reports of local furnaces not running or operated on slow time are not heard, so that the consumption is considerably increased. The prospect is for a steady, though not rapid increase of activity through the rest of the season. Prices remain as before, $7.85 for 72-hr. foundry, $7.10 to $7.35 for 48-hr. furnace, and $6.20 for off grades, with fuel sizes and breeze not moving much.

## Middle Western

### GENERAL REVIEW

**Some signs of improvement noticeable. Steam coal trade not as good as it might be. Car shortage beginning to be felt.**

Market conditions in the Mid-West are showing signs of some improvement, although one has to inspect the situation carefully to find this change for the better. The demand for domestic coals is continuing very strong, and in some cases premiums are being paid for high-grade Illinois and Indiana lump, egg and nut sizes. Steam coals are still continuing to be a drag on the market, although the demand was increasing to some small extent during the last week. This demand is probably explained by the fact that the mines were closed down over the Fourth.

The situation of steam coals in the central markets of this territory is far better than the situation in the East and near East, particularly in such cities as Detroit, Cincinnati, Columbus, etc. Hocking operators and West Virginia operators are flooding the market with cheap nut and slack. By cheap we are referring to coal that is being sold at 90c. per ton and under. Illinois and Indiana operators, as a general rule, have been maintaining their price on screenings at $1.50, or better. The Franklin County people have consistently been getting $2 or better for their fine coals. Operators in the Mid-Western territory certainly deserve praise for being able to maintain their prices as well as they have, especially in view of the fact that a Hocking operator, with 100 or so cars of "distress" coal on his sidings, is selling a whole lot of it to a Chicago packer at a price below $1 per ton mines. Considerable feeling has developed from this sale, as Illinois and Indiana producers feel that they have enough problems on their hands without having their market demoralized by Ohio producers with poor sales organizations.

The long-heralded car shortage is beginning to be felt. We understand that several mines in the Springfield district, as well as the southern District in Illinois, have been affected, although plenty of cars are reported in the Indiana coal fields. A car shortage is coming, and coming fast. This is getting to be a well recognized factor in the coal situation. We understand that several important producing districts in Kentucky and West Virginia have already been seriously affected by lack of equipment in which to ship their coal. It is the general opinion that it will only be a matter of a short time before this will be true in our own producing districts.

### CHICAGO

**Steam trade dull and domestic demand strong. Prepared sizes of Pocahontas and New River moving for export.**

The steam trade in this city continues to lag, although prices have been fairly well maintained because producers have intelligence enough not to flood the market with open consignments of coal, preferring to keep no bills at the mines rather than shipping to the jobbers in Chicago. Although prospects for a better steam market in this city are fairly bright, there has been little immediate improvement over last week, and no radical improvements are expected until two or three weeks from now.

The domestic situation continues strong. We understand that the more responsible Pocahontas operators have discontinued increasing the price of their prepared coals, as they believe that the public will not stand for prices over and above $5 on prepared sizes at this time. It is generally understood that the Pocahontas and New River operators are in an independent position, because they are able to send practically all of their coal to the seaboard for export, and at a very nice price. We understand that the last export coal was sold at $3.56 mines, for run-of-mine.

The retailers of Chicago are beginning to stock coal in better quantities, although they claim in doing this they are taking a chance as the public has shown but little inclination toward purchasing at this time.

### MILWAUKEE

**Coal market quiet, with a falling off in demand. Cargoes arriving freely by lake. Coke in no demand.**

Summer dullness rules in the coal market. Dealers report the situation as being quiet, with a falling off in deliveries. The Milwaukee public seems to be satisfied with the outlook for coal, despite the disturbing statements published by those best able to judge the situation at the mines. Coke is not moving as fast as the producers would like and stock piles are increasing fast.

There has been a steady run of cargoes at the docks thus far in July, and the aggregate of receipts continues in excess of last year. Up to the present time 254,764 tons of anthracite and 1,307,913 tons of soft coal have been landed on the docks, a gain of 71,750 tons of anthracite and 336,011 tons of soft coal over the receipts during the same period last year.

There has been no change in the price schedule.

### ST. LOUIS

**A runaway market on high grade, domestic sizes. All high-grade mines sold up. Steam market weak and no coal. Mines idle account of surplus steam sizes. Country demand good on domestic. Awakened public buy eagerly of better coals.**

The past week has developed an unusual condition in the St. Louis territory. Every high-grade mine in the State of Illinois is oversold on lump and egg coal. Nut and screenings are so much in surplus that mines are idle on account of the failure to move them. With the continuous growing demand for domestic sizes and no chance at all of the steam conditions improving, the Middle West is confronting a serious shortage of domestic coal of the higher grade.

In the Williamson (Franklin County) field there is at the present time a mild car shortage. The movement in a general way of the loads is good, but the no bills of the smaller sizes from No. 1 nut down is so heavy at nearly all the mines that it is becoming a serious problem of the railroads as to what is eventually going to become of the no-billed cars. At the present time many mines are unable to get equipment for loading until they reduce the number of the no bills on their track. They are making a strenuous effort to work in order to keep their organizations together. Mines are working from two to four days a week, with the exception of a few mines in Franklin County that are getting full time, and a like number in Williamson County. The prices are being maintained in the Franklin County field without exception. The Williamson County independents are still below the circular.

In the Du Quoin field similar conditions exist, and prices are not maintained. This is occasioned by the fact that a few operators there are cutting, in order to move the smaller sizes. A fairly good railroad tonnage is going from both fields. The past week the railroad tonnage was increased considerably, which indicates that some storage railroad coal is being bought.

In the Mount Olive district there has been a noticeable increase in the movement of the domestic sizes the past week, especially to the north and northwest, and for country trade. Steam sizes from this field seem to move more evenly than from other districts and the situation is more satisfactory than elsewhere. The prices are maintained and the mines are getting better working time than in the surrounding fields.

The Standard field is still long on everything. Steam sizes are the most troublesome and some mines are idle on this account, while other mines have no bill lump, egg and nut, and are sold out on screenings. Cars are plentiful and train movement good.

Railroad tonnage shows an increase this week over last, and in a general way the working time of all mines has improved. Steam market for coal from this district shows no improvement, however, with the result that there is a greater tonnage of no bills than in any other district.

The local condition in St. Louis is remarkable. Dealers are getting orders for more Carterville coal than they can get from the mines. The same condition applies in a way to anthracite and smokeless. The Mount Olive demand is light, but seems to be growing, while Standard shows little if any improvement.

In the country a good movement of Standard coal is reported for domestic purposes and country steam business shows up somewhat better than for some weeks past.

Smokeless coal came in during the week to the extent of about 25 cars. Anthracite is scarce and little is coming through. No Arkansas anthracite has come in yet, but a few cars of smokeless that up to the present has not improved satisfactorily.

Coke is moving fairly good for domestic purposes.

## Coal and Coke Securities

New York Stock Exchange Closing Quotations July 14, 1919

| STOCKS | Ticker Abvn. | Bid | Asked |
|---|---|---|---|
| American Coal Co. of Allegheny | (ACL) | 45 | .... |
| Burns Brothers, Com | (BB) | 150 | 155 |
| Burns Brothers, Pfd | (BB) | 110 | 115 |
| Central Coak & Coke, Com | (CK) | 55 | .... |
| Central Coal & Coke, Pfd | (CK) | 63 | .... |
| Colorado Fuel & Iron, Com | (CF) | 51 | 52¼ |
| Colorado Fuel & Iron, Pfd | (CF) | 105 | 125 |
| Consolidation Coal of Maryland | (CGM) | 75 | .... |
| Elk Horn Coal, Com | (EH) | 38½ | 39 |
| Elk Horn Coal, Pfd | (EH) | .... | 47 |
| Island Creek Coal, Com | (ICR) | 39 | .... |
| Island Creek Coal, Pfd | (ICR) | 75 | .... |
| Jefferson & Clearfield Coal & Iron, Pfd | (JF) | 63 | .... |
| New Central Coal of West Va | (NCC) | 5 | .... |
| Pittsburgh Coal, Com | (PC) | 71¼ | 71½ |
| Pittsburgh Coal, Pfd | (PC) | 96 | 98 |
| Pond Creek Coal | (PD) | 19 | 20 |
| Virginia Iron, Coal & Coke | (VK) | 66 | 69 |

| BONDS | Bid | Asked |
|---|---|---|
| Cahaba Coal, 1st Gtd. 6s, 1922 | 97 | .... |
| Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940 | 75½ | .... |
| Colorado Fuel & Iron, Gen. 5s, 1943 | 90 | 91½ |
| Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934 | 80½ | 81 |
| Consolidation Coal of Maryland, 1st Ref. 5s, 1950 | 87 | 88 |
| Jefferson & Clearfield Coal & Iron, Sec. Mort. 5s, 1926 | 96 | .... |
| Lehigh Valley Coal, 1st Gtd. 5s, 1933 | 100 | 101 |
| Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1913 | 79¼ | .... |
| Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954 | 90 | .... |
| Pleasant Valley Coal, 1st S. F., 5s, 1928 | 80½ | .... |
| Pochontas Coal & Coke, Joint 4s, 1941 | 83½ | 84½ |
| Pocahontas Con. Collieries, 1st S. F. 5s, 1957 | 84½ | 87½ |
| Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946 | 98 | .... |
| St. L., Rocky Mnt. & Pac. Stamped 5s, 1955 | .... | 80½ |
| Tenn. Coal, Iron & R.R., Gen. 5s, 1951 | 92 | 92½ |
| Utah Fuel, 1st Sinking Fund 5s, 1931 | 87 | .... |
| Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953 | 55 | 70 |
| Virginia Iron, Coal & Coke 1st 5s, 1949 | 85½ | 85½ |